# Your NEW BUICK

THINGS YOU WILL WANT TO KNOW ABOUT ITS OPERATION AND CARE

1938

MD-300 - 12.00

# 1938
# BUICK OWNER'S MANUAL

"How the 1938 Buick operates."

"Why it operates as it does."

"What you can do to keep it operating at its best."

**BUICK MOTOR DIVISION,**
**General Motors Sales Corporation**
**FLINT, MICHIGAN**

Third Edition

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## THINGS YOU WILL WANT TO KNOW


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**P. S. There is a special section entitled "For the Mechanically Minded," in back part of book**

**BUICK MOTOR DIVISION**
**General Motors Sales Corporation**
**FLINT, MICHIGAN**

To all Buick Owners:

It is our sincerest wish that your purchase of a new Buick be merely a milestone in a long and friendly relationship with our organization.

Ever since the first Buick was painstakingly assembled, it has been our policy to build and maintain a dealer organization which would not only be a credit to your community, but stand ever ready, willing and able to serve you.

We suggest that you become well acquainted with your dealer and his facilities for pleasingly serving you. He shares with us a wish that you make his place of business your automobile headquarters not only for this year but for the many years of motoring pleasure which we hope will be yours.

This book has been carefully prepared with a view to presenting those facts which will assist you in getting the utmost in satisfaction, safety and economy from your Buick automobile.

Sincerely yours,

H. H. Hufstader

General Sales Manager
Buick Motor Division
Flint, Michigan

**P. S. In order that you will be able to quickly pick out those items that have important bearing on maintenance and servicing of your car, we have printed the service instructions in red (like this paragraph).**

## LICENSE WEIGHTS

### Special (Series 40) 122" Wheelbase

| Model | Body Style | License Weights |
|---|---|---|
| 38-44 | 5-Pass. Two-Door Streamline Sport Sedan | 3515 |
| 38-48 | 5-Pass. Two-Door Touring Sedan (Trunk Back) | 3520 |
| 38-47 | 5-Pass. Four-Door Streamline Sport Sedan | 3535 |
| 38-41 | 5-Pass. Four-Door Touring Sedan (Trunk Back) | 3560 |
| 38-46 | 2-Pass. Business Coupe (Plain Back) | 3385 |
| 38-46S | 4-Pass. Sport Coupe (Opera Seats) | 3425 |
| 38-46C | 4-Pass. Convertible Coupe (Rumble Seat) | 3575 |
| 38-40C | 5-Pass. Convertible Streamline Sport Phaeton | 3705 |

### Century (Series 60) 126" Wheelbase

| | | |
|---|---|---|
| 38-68 | 5-Pass. Two-Door Touring Sedan (Trunk Back) | 3760 |
| 38-67 | 5-Pass. Four-Door Streamline Sport Sedan | 3785 |
| 38-61 | 5-Pass. Four-Door Touring Sedan (Trunk Back) | 3780 |
| 38-66S | 4-Pass. Sport Coupe (Opera Seat) | 3690 |
| 38-66C | 4-Pass. Convertible Coupe (Rumble Seat) | 3815 |
| 38-60C | 5-Pass. Convertible Streamline Sport Phaeton | |

### Roadmaster (Series 80) 133" Wheelbase

| | | |
|---|---|---|
| 38-80C | 6-Pass. Four-Door Streamline Sport Phaeton | |
| 38-81 | 6-Pass. Four-Door Touring Sedan (Trunk Back) | 4245 |
| 38-81F | 6-Pass. Four-Door Formal Sedan (Trunk Back) | |
| 38-87 | 6-Pass. Four-Door Streamline Sport Sedan | |

### Limited (Series 90) 140" Wheelbase

| | | |
|---|---|---|
| 38-90 | 8-Pass. Four-Door Touring Sedan (Trunk Back) | |
| 38-90L | 8-Pass. Limousine (Trunk Back) | |
| 38-91 | 6-Pass. Four-Door Touring Sedan (Trunk Back) | |

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NOTE: Above license weights are established average shipping weights for standard five-wheel equipped cars. For optional six-wheel equipment, add as follows:

**Six-Wheel Equipment**

Series 40-60-80-90 ..... 100 lbs.



## SPECIFICATIONS AND LICENSE DATA

| | Special | Century | Roadmaster | Limited |
|---|---|---|---|---|
| | Series 40 | Series 60 | Series 80 | Series 90 |
| Wheelbase | 122" | 126" | 133" | 140" |
| Tire size | 16 x 6.50, 4-ply | 15 x 7.00, 4-ply | 16 x 7.00, 4-ply | 16 x 7.50, 6-ply |
| Bore | $3\frac{3}{32}$" | $3\frac{7}{16}$" | $3\frac{7}{16}$" | $3\frac{7}{16}$" |
| Stroke | $4\frac{1}{8}$" | $4\frac{5}{16}$" | $4\frac{5}{16}$" | $4\frac{5}{16}$" |
| Piston displacement | 248.0 cu. in. | 320.0 cu. in. | 320.0 cu. in. | 320.0 cu. in. |
| Horsepower (A.M.A. Rating) | 30.63 | 37.81 | 37.81 | 37.81 |
| Horsepower (actual) | 107 at 3400 R.P.M. | 141 at 3600 R.P.M. | 141 at 3600 R.P.M. | 141 at 3600 R.P.M. |
| Firing order | 1-6-2-5-8-3-7-4 all Series | | | |

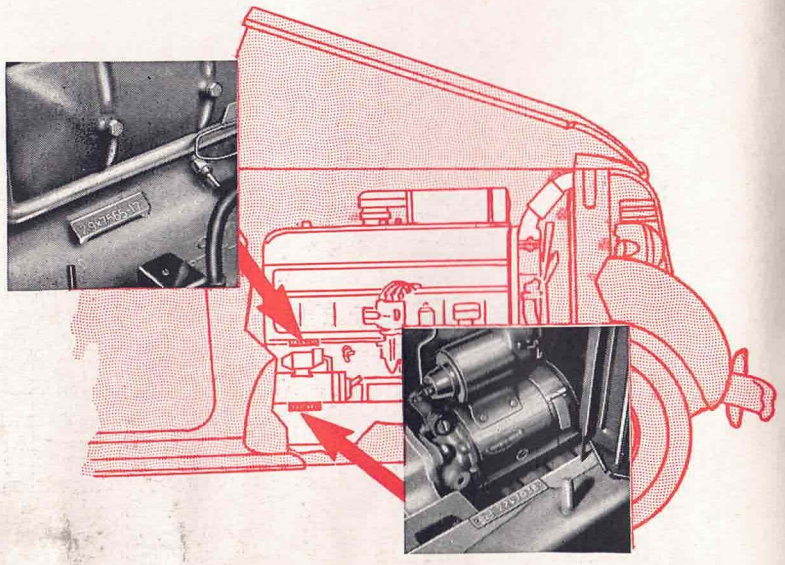
## CAPACITIES

| | | | | |
|---|---|---|---|---|
| Gasoline tank | 18 gals. | 18 gals. | 20 gals. | 20 gals. |
| Cooling system | *13¼ qts. | *17 qts. | *17 qts. | *17 qts. |
| Transmission (standard) | 1¾ pts. | 2½ pts. | 2½ pts. | 2½ pts. |
| Differential | 3 lbs. | 3 lbs. | 4 lbs. | 4 lbs. |
| Oil capacity (refill) | 6 qts. | 8 qts. | 8 qts. | 8 qts. |
| Oil capacity (dry engine) | 7 qts. | 9 qts. | 9 qts. | 9 qts. |

*Add 1 quart when car is equipped with Buick Hot Water Heater.

## ADJUSTMENTS

| | | | | |
|---|---|---|---|---|
| Valve lash or clearance | .015" Hot | .015" Hot | .015" Hot | .015" Hot |
| Distributor point opening | .015" | .015" | .015" | .015" |
| Spark plug gap | .023" to .028" | .023" to .028" | .023" to .028" | .023" to .028" |
| Clutch pedal lash or free movement | ¾" to 1" | ¾" to 1" | ¾" to 1" | ¾" to 1" |



Top inset shows location of motor number
Lower inset shows location of serial number

## NUMBERS ON YOUR BUICK

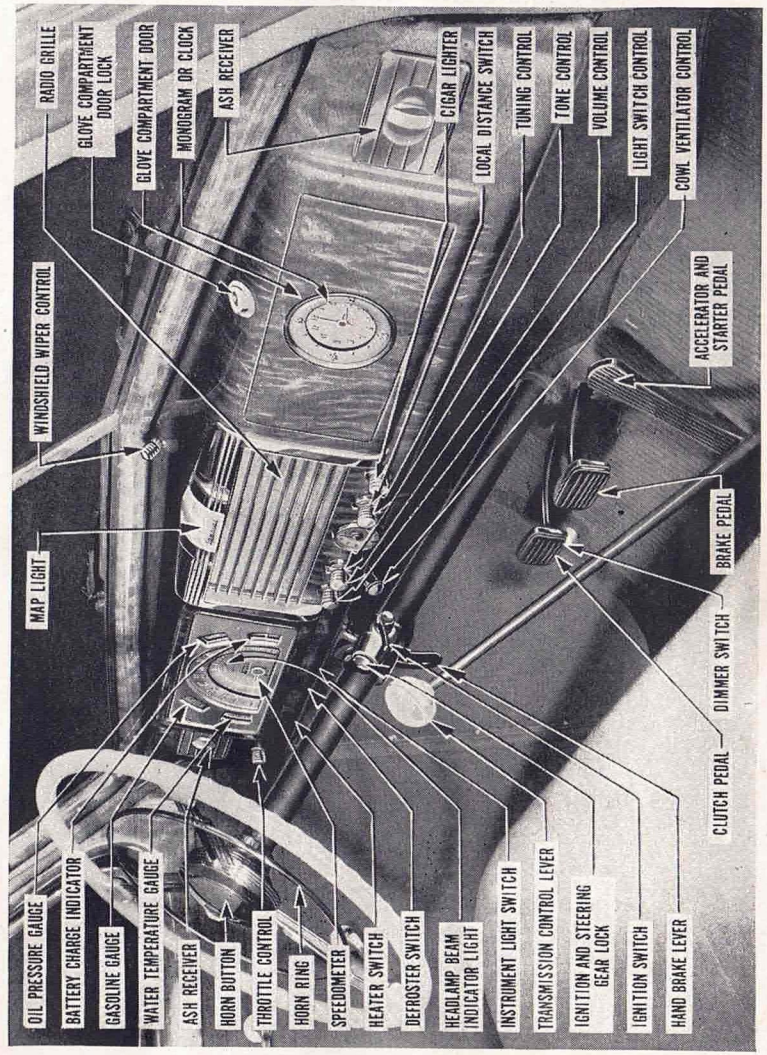
There are two numbers on your Buick that identify it as your own. You are required to record these numbers when you register your car in applying for car license. The location of these numbers are described and illustrated above.

## ENGINE AND SERIAL NUMBER LOCATIONS

Engine Number is stamped on a raised boss located at right side of crankcase below push rod cover, at rear.

Serial Number plate is affixed to right upper flange of frame, adjacent to the rear engine support, and is visible by lifting right side of hood.






DRIVING COMPARTMENT

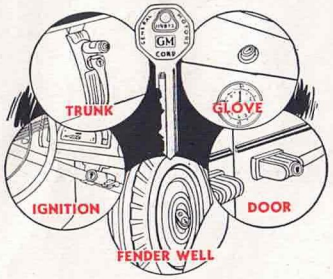
## BREAKING IN YOUR CAR

When breaking in your new Buick, it is advisable that you limit driving speeds during the first 1000 miles of operation, in order that the closely fitted parts will run in smoothly.

It is suggested that you **do not drive above 50 miles an hour for the first 250 miles of operation. For the next 250 miles, somewhat higher speeds may be used for short distances after the engine has been warmed up.** Warming the engine at slower speeds allows all parts to expand more uniformly to operating clearances.

**Sustained high speed driving should be avoided until the car has been driven at least 1000 miles.**

## OPERATION OF LOCKS



Locks

Your Buick is equipped with two keys. These keys, however, are identical. Each of them fits the various locks illustrated at left.

You will notice that there is a small, removable, numbered disc in the top of the keys. Punch out this disc and retain it in some safe place. Then, in the event you should misplace both keys, you can purchase duplicate keys through your local Authorized Buick Dealer by simply referring to that number.

**IMPORTANT: Always lock your car whenever you leave it unattended.** The lock on the steering post locks both the ignition and the steering wheel, thereby making your Buick doubly theft-proof.

If the car should be left where it must be operated, the glove compartment and trunk may be locked and keys retained, assuring complete privacy for these compartments.

## SERVICE OPERATIONS THAT SHOULD BE DONE REGULARLY

### Have Your Buick Dealer Do These Things:

**EVERY WEEK**

- Adjust tire pressure, see page 45.

**EVERY TWO WEEKS**

- Add water to battery as required. See page 52.

**EVERY 1000 MILES**

- Chassis lubrication. See lubrication chart at back of book or take car to an Authorized Buick Service Station, which will also check such items as tire pressures, battery, lights, fan belt, and brake pedal feel.

**EVERY 2000 MILES**

- Have transmission and rear axle checked for lubricant. See lubrication chart, also page 22. This check is a part of chassis lubrication.
- Have air cleaner filter cleaned—Regular Air Cleaner. See "Every 10,000 Miles," page 10, if your car is equipped with the Heavy Duty Air Cleaner. This can be identified by referring to illustration on page 86.

**EVERY 2000 TO 3000 MILES**

- Have engine oil changed. Better read page 21 to determine when this should be done in your car.

**EVERY 5000 MILES**

- An engine tune-up is advisable at about this mileage to maintain engine in prime condition.

## EVERY 10,000 MILES

- If your car is equipped with the Heavy Duty Air Cleaner, this should be washed and re-oiled. This can easily be identified by referring to illustration on page 86.
- Spark plugs should be checked. It is generally advisable to renew same each 10,000 miles.

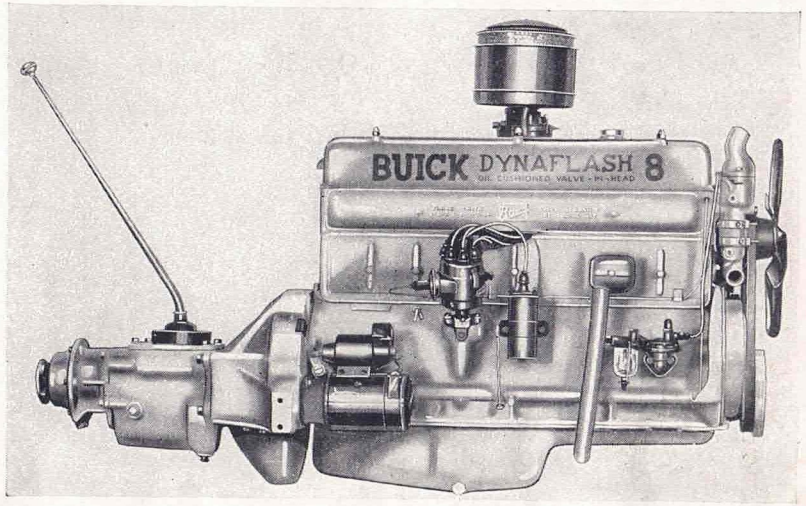
## EVERY SPRING—Better see your Buick Dealer.

- Have transmission completely drained, flushed and refilled with correct lubricant for summer weather.
  **Note:** If car is equipped with the Buick Self-Shifting Transmission, it should never be "flushed." See instructions supplied with all cars so equipped.
- Have cooling system drained and cleaned. Reverse flushing at this time is a good preventative for clogging of radiator passages. Add Radiator Rust Preventive oil.
- Front wheel bearings should be lubricated. (Better have brake lining checked for wear while wheels are off.)
- Shock absorbers should be checked and refilled if necessary.
- Steering gear should be filled with correct lubricant.
- Drain and flush differential (with flushing oil), fill with correct grade of Hypoid gear lubricant. See lubrication chart or take car to an Authorized Buick Service Station. (Do not flush with gasoline, kerosene, steam, etc.)

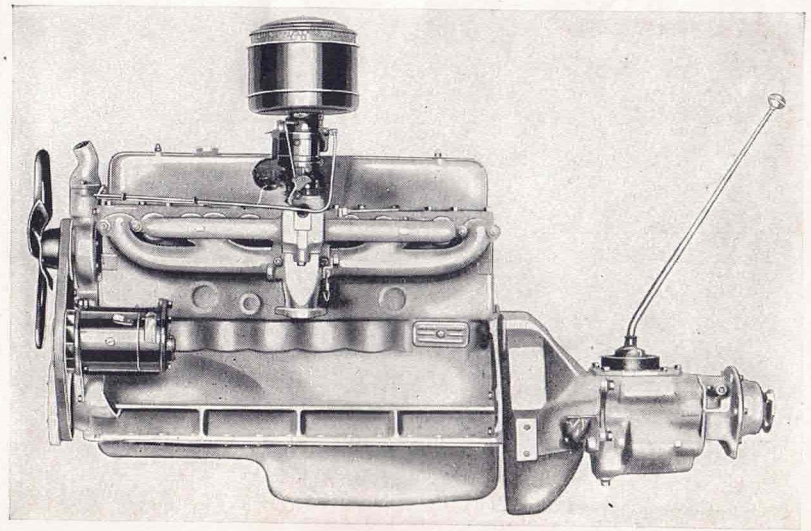
## EVERY FALL—Better see your Buick Dealer

- Have engine conditioned for Winter driving. A major tune-up is advisable.
- Check starting motor, generator, battery and wiring.
- Have transmission completely drained and refilled with correct lubricant for winter weather.
- Have cooling system drained and cleaned. Do not use compounds unless system is immediately "reverse flushed." Put in anti-freeze, in climates where freezing may occur.
- Front wheel bearings should be lubricated. (Better have brake lining checked for wear while wheels are off.)
- Shock absorbers should be checked and refilled if necessary.
- Steering gear should be filled with correct lubricant.
- Drain and flush differential (with flushing oil), fill with correct grade of Hypoid gear lubricant. See lubrication chart or take car to an Authorized Buick Service Station. (Do not flush with gasoline, kerosene, steam, etc.)

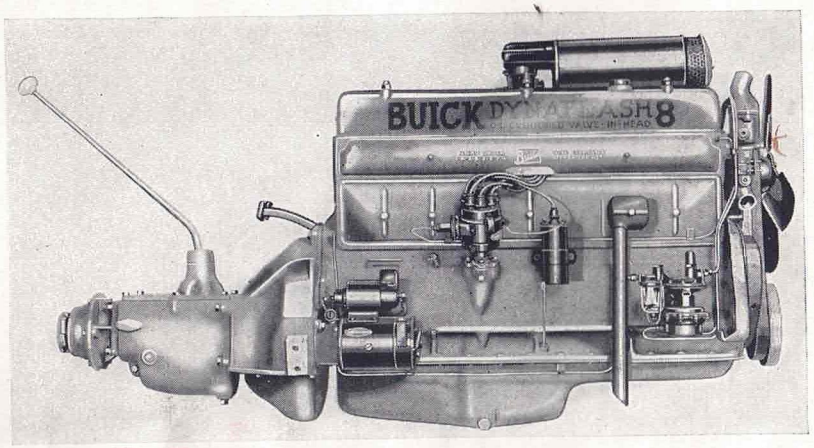




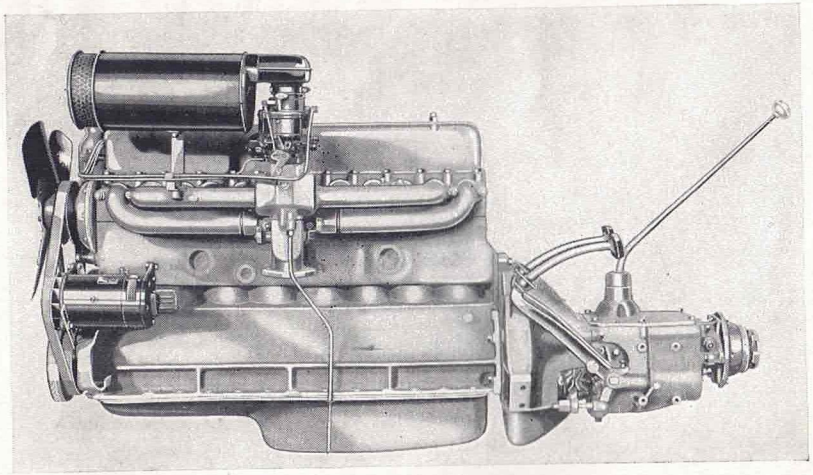

Series 40 Engine—Right Side



Series 40 Engine—Left Side




Series 60-80-90 Engine—Right Side



Series 60-80-90 Engine—Left Side

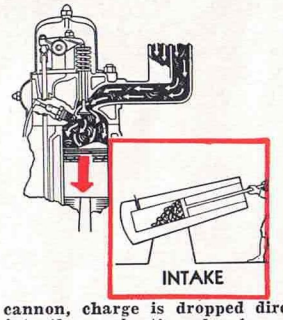


# BUICK DYNAFLASH ENGINE

Dynaflash! . . . expresses in a word your thought reactions after you have driven behind this quiet, smooth, powerful Buick valve-in-head engine. The valve-in-head design has much to do with the brilliant performance you get from this engine, and it is interesting to see why this type develops more power than other types.

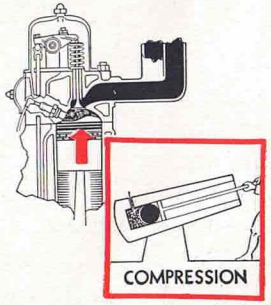
Here is a simple explanation in step-by-step diagrams and descriptions.

**In the valve-in-head engine the mixture drops freely from the manifold down into the combustion chambers through unrestricted intake passages. It is, of course, much easier for the fuel mixture to travel downward than it is to lift it against gravity.**



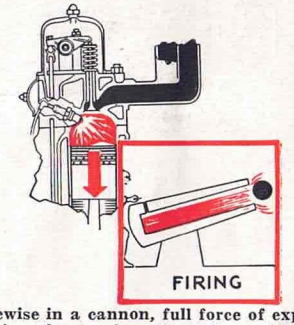

**In a cannon, charge is dropped directly into the combustion chamber**

**The combustion chambers are so compact that they reduce heat loss to a minimum.**



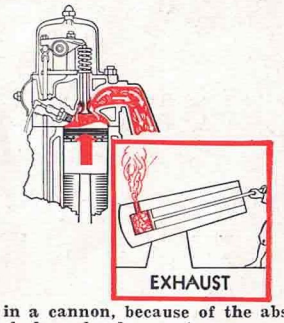

**In a cannon, the charge is packed directly behind the ball**

**In the valve-in-head engine, full force of the explosion gases are concentrated directly on top of the piston. Naturally, the full force of a blow has the greatest driving power.**




**Likewise in a cannon, full force of exploding charge gives the ball greatest driving power**

**The exhaust valves are also directly above the piston. As a result the spent gases escape quickly and completely, thus preventing dilution of the incoming charge.**




**Also in a cannon, because of the absence of sharp bends, spent gases are quickly removed**

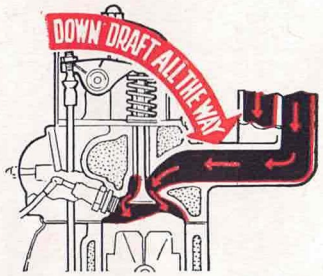
The above illustrations have clearly shown how the valve-in-head engine "breathes" easily and deeply and why it develops

approximately ten per cent more power than other engines of equal size and compression.

The gasoline engine derives its power from the heat developed through the burning and expansion of the gas in its cylinders. Therefore, it is obvious that the engine which conserves the most heat units in each charge of fuel will show the greatest efficiency and economy.

This is where the valve-in-head engine has the "edge" over other types of gas engines.

Ordinary engine manifolding

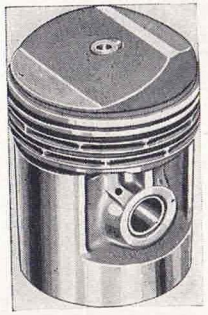


Valve-in-head engine manifolding

## BUICK TURBULATOR PISTON

Buick this year has made tremendous strides in producing extra horsepower without increasing the engine displacement, which means without adding to the cost of operation, either by weight or by decreasing the gasoline economy.

The Series 40 has been increased from 100 H. P. (1937) to 107 H. P. (1938) and the Series 60-80-90 from 130 H. P. (1937) to 141 H. P. (1938)


Piston

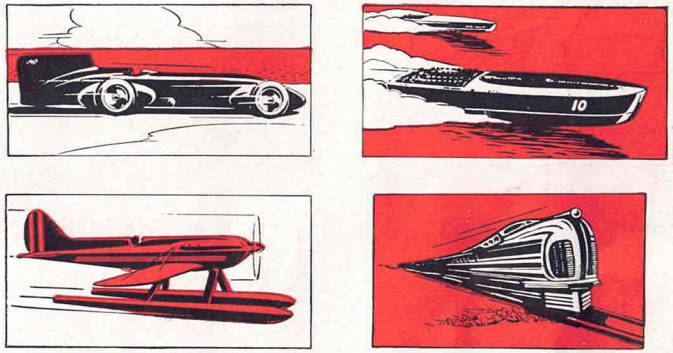
This increase has been obtained solely as the result of a new piston known as the Buick Turbulator Piston.

Increased compression makes for more efficient operation because the "burning" spreads with greater rapidity throughout the combustion chamber. Simply increasing the compression would result in annoying detonation or "spark rap." In the 1938 Buick engine the shape of the piston head controls the burning of the fuel and eliminates the spark rap which would otherwise accompany the higher compression ratio.



The modified dome shape of the piston causes the gases to "whirl" at cyclone velocities and has much to do with this controlled burning.

These Buick pistons are made of a light weight, low expansion alloy and treated electro-chemically to give an outer surface which is both hard and porous.


All records of speed and durability for land, air and sea are held by vehicles powered by valve-in-head engines

# BUICK AUTOMATIC STARTING SYSTEM

## STARTING THE ENGINE

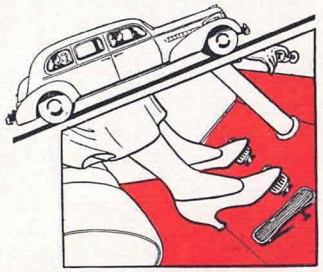
**Buick starting is automatic. You simply turn on the ignition, step on the accelerator and the engine starts immediately.** Or, if both feet are engaged, the engine can be started by pulling out the throttle on the instrument panel.

**There is no choke lever to handle.** Consequently, it is practically impossible to starve or flood the engine when starting.

This automatic starting is provided by the following units: Solenoid Starter Engagement (with dual control accelerator pedal and hand throttle), Automatic Choke, Automatic Idle Control and Automatic Heat Control.

## STARTING ON HILLS

If it becomes necessary to start the engine when headed up an incline you have in addition to your regular method of starting, the advantage and safety provided by throttle control starting. To



take advantage of this throttle, when starting on a hill:

Hold the car with the foot brake. Disengage clutch, turn on ignition switch, then pull out hand throttle and engine will start. When engine starts, set the hand throttle to a fast idle, shift into first gear and release the pressure on brakes and clutch until the car is started. Then place your right foot on the accelerator to maintain car speed and close the hand throttle. **Don't forget to push back the hand throttle after you are under way.**

## ACCELERATOR AND HAND THROTTLE—DUAL CONTROL

In depressing the accelerator pedal or pulling out hand throttle, a solenoid automatically meshes the starter gear with the teeth on the flywheel, before the starter operates. This positive starter engagement eliminates the danger of chipping or burring the flywheel and starter teeth.

When the ignition switch is in "off" position, starter mechanism is inoperative. Therefore, if switch is locked it is impossible to use the starter to move the car and thus run down the battery, as otherwise could happen in a parking lot. Likewise, as soon as the engine starts, the solenoid control circuit is automatically opened, permitting the starter gear to disengage from the flywheel.

Should the engine stall for any reason with the accelerator depressed, lift your foot completely off the pedal before restarting the engine. This allows the vacuum switch to return to position and make the starting contact. The same is true when operating the starter from the hand throttle—it must be pushed in fully before another start can be made. This latching arrangement prevents engagement of the starter with the engine running.

You can see from the above that just as soon as the engine is firing regularly and evenly the starter gear is disengaged automatically. **So it is not necessary for the driver to withdraw his foot from the accelerator pedal, except to regulate speed of the engine.**

## THE BUICK AUTOMATIC CHOKE

Another important feature of Buick's starting system is the Automatic Choke. This simple device eliminates all bothersome manual choking and automatically controls the air-fuel mixture strictly in accordance with the engine's requirements.



The combined action of engine vacuum and a thermostat located in the choke body on the side of the carburetor automatically controls the opening and closing of the choke valve.

When the engine is cold it gives a rich mixture and when the engine warms up the thermostat opens the choke valve to give best mixture for efficient engine operation.

The Buick Automatic Choke not only makes starting easier and quicker but also gives protection against fuel waste and excessive engine wear.

For example, too rich a mixture causes excessive fuel consumption. Furthermore, if the mixture is too rich, unburned gasoline will run past the pistons, diluting and washing the lubricant from the cylinder walls. On the other hand, a lean mixture makes the engine stall, and causes excessive drain of the battery through frequent starting. The Buick choke automatically prevents the mixture from becoming too rich or too lean.

You probably have noticed there is no spitting or choking when you accelerate your new Buick, even before the engine is warmed up. This is due to the operation of the automatic choke which furnishes a real safeguard for smooth operation at all times and under all conditions.

## AUTOMATIC IDLE CONTROL

Automatic Idle Control of the throttle is a feature on all Series of the 1938 Buicks. This unit, which is thermostatically operated, furnishes a fast idling speed for a cold engine and a normal idling speed of 7 to 8 miles per hour for a warm engine. This feature greatly contributes to the ease of cold weather starting by insuring correct idling speed under all operating temperatures.

## AUTOMATIC HEAT CONTROL

The Automatic Heat Control on the intake manifold is also thermostatically operated. This unit quickly warms up the intake manifold riser in cold weather operation and maintains efficient mixture temperatures of the manifold under all driving conditions.

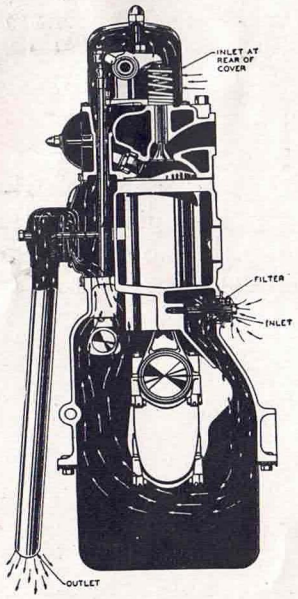
It pre-heats and vaporizes the inrushing gas which, in turn, gives better engine performance and economy of operation.

**CAUTION: The exhaust fumes of all gasoline motors contain an extremely poisonous gas known as carbon monoxide. It is colorless, tasteless and odorless.**

**Open your garage doors before starting the engine and always keep them wide open whenever engine is running.**

## BUICK CONTROLLED CRANKCASE VENTILATION

The ventilation of the crankcase, as built into the Buick engine, has probably done more to prolong engine life than any other single development. It does this by removing harmful "dilution," which is caused by several conditions, as follows:



**Sectional View—Crankcase Ventilation**

When starting the engine, especially in cold weather, some unburned gas is likely to work past the rings and pistons into the crankcase, and unless it is removed, the crankcase oil becomes diluted.

When gasoline is burned in the cylinders, one of the by-products of the chemical action is water vapor. The hydrogen in the gasoline combines with the oxygen in the air and forms water. For each gallon of gasoline consumed, slightly more than a gallon of water is formed.

Most of this water in the form of vapor passes out through the exhaust pipe, but a small amount may leak past the rings and pistons and condense in the crankcase. Water in the crankcase is undesirable—it may cause the crankcase oil to sludge, and in winter may freeze and interfere with the flow of oil through the lubricating system.

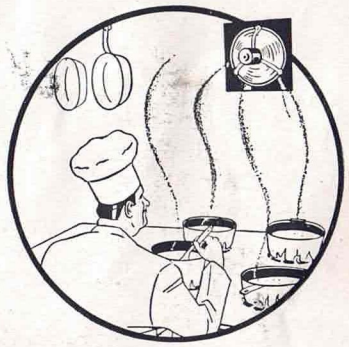
Also, all gasoline or motor fuel contains a small percentage of sulphur. When the gasoline burns, the sulphur burns also. A small amount of the oxides of sulphur formed during combustion may combine chemically with water, if present in the crankcase, and form sulphuric acid.



Sulphuric acid is very strong, and even when diluted with water, will corrode iron and steel. By removing the water vapors before these unite with the sulphur, corrosion is practically eliminated.

## HOW IT WORKS

The engine ventilating system, used to prevent harmful dilution of engine oil, utilizes the crankshaft as a blower to force fuel and water vapors from the crankcase through a ventilator outlet pipe attached to the valve lifter compartment cover.



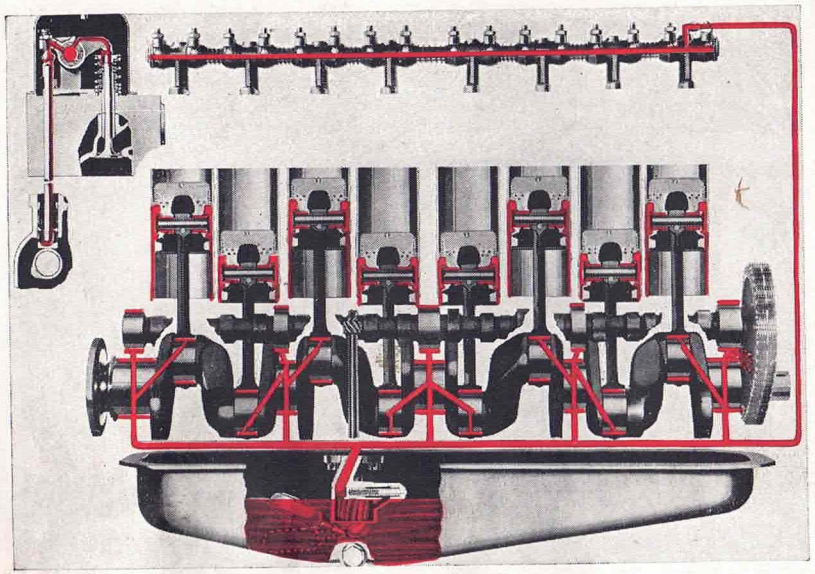
The rocker arm compartment is also ventilated. The air pressure built up at the dash enters an opening at the rear of the rocker arm cover and this air circulates through the rocker arm compartment, carrying vapors with it, discharging through the ventilator outlet pipe.

The ventilating system does not remove all fuel dilution because a small amount is advantageous in cold weather. It does, however, prevent an accumulation of more than 20% fuel dilution and removes all water under average driving conditions.

## ENGINE LUBRICATION

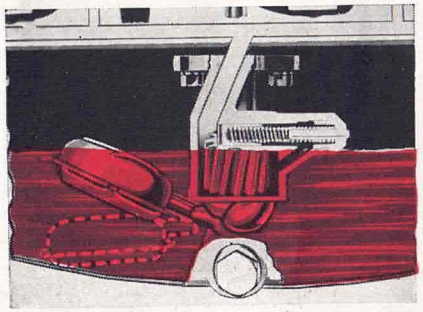
All of the vital working parts of the engine are lubricated by the oil in the crankcase which is circulated through the engine by the oiling system.

Buick uses what is known as a pressure type oiling system—that is, one in which oil is forced by a gear driven pump to all main, connecting rod, camshaft and rocker arm shaft bearings. In addition, it forces oil in a positive flow to such parts as the timing chain, piston pins and valve lifter mechanism, thus cushioning every moving part with a film of oil.



Buick's Efficient Pressure Oiling System

To make certain that only clean oil is drawn into the pump, a floating oil screen is used. This screen is connected to the oil inlet pipe, which is pivoted at the pump. Thus, regardless of the oil level, the oil is always drawn from the clean top surface—above any impurities and sediment which might collect at the bottom of the pan where it is flushed out at the time oil is changed.



Floating Oil Pump Screen and Inlet Pipe

## WHEN TO CHANGE CRANKCASE OIL

To insure continuation of best performance, low maintenance cost and long engine life, it is necessary to change the crankcase oil whenever it becomes contaminated with harmful foreign materials. **Under normal driving conditions draining the crankcase and replacing with fresh oil every 2000 to 3000 miles is recommended.** Under adverse driving conditions it may become necessary to drain the crankcase oil more frequently.



These are some of the reasons why oil should be changed more frequently:

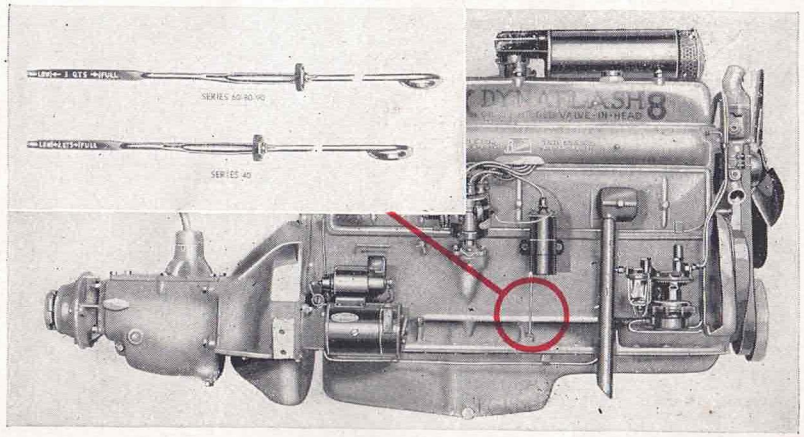
- Dusty roads or dust storms cause contamination of engine oil even though the best of air cleaners are used.
- Short runs, frequent starts in cold weather increase "dilution" and water condensation in crankcase.
- Hard driving thickens oils and this may interfere with easy starting in cold weather.

**Your driving, local conditions and temperature must furnish the basis for deciding how frequently the oil should be changed.**

It is always advisable to drain the crankcase after engine has reached normal operating temperature. The benefit of draining is, to a large extent, lost if crankcase is drained when engine is cold as some foreign material, such as fine metal particles from wear, will cling to sides of oil pan and will not drain out readily with cold, thick oil.

## MAINTAINING OIL LEVEL

The Oil Gauge Rod is marked "Full" and "Low." **The oil level should be maintained between these two lines,** neither going above the "full" line nor under the "low" line.



Oil Measuring Gauge

**Check the oil level frequently and add oil when necessary.** It is good economy to let the oil level approach the "low" mark when you are about to have the oil changed. **Always be sure the crankcase is full before starting out on a long drive.**

Oil capacities of the different Buick models are as follows:

| | | |
|---|---|---|
| Special | Series 40 | 6 quarts for refill |
| Century | Series 60 | 8 quarts for refill |
| Roadmaster | Series 80 | 8 quarts for refill |
| Limited | Series 90 | 8 quarts for refill |

After the car has been running and the oil level reading on the bayonet is taken immediately upon stopping, it may be slightly below the "FULL" mark. Waiting about one minute, after engine is shut off, will give a more accurate reading. This allows the oil to drain back from engine parts.

While waiting, if the Oil Gauge Rod is cooled by removing, and a reading then taken, the oil will "stick" to same and be easier to read.

## S.A.E. VISCOSITY NUMBERS

The viscosity of a lubricant is simply a measure of its body or fluidity. The S.A.E. viscosity numbers constitute a classification of lubricants in terms of viscosity, or fluidity, but without reference to any other characteristics or properties. Oils with lower numbers are lighter and flow more readily than do oils with higher numbers.

The refiner or marketer supplying the oil is responsible for the quality of its product. Their reputation is the car owner's best indication of quality.

## ENGINE OIL RECOMMENDATIONS

The proper selection of a crankcase oil will add much to the performance, reliability, economy and long life of the engine. (See viscosity recommendations on following page.)

**"Break-in" oils or compounds are entirely unnecessary.** They should not be used under any circumstances unless the supplier can furnish satisfactory proof that the compound contains no harmful ingredients.



## LUBRICATION—FIRST 1000 MILES

**During the first 1000 miles, it is recommended you use the crankcase oil put in by the factory or dealer.** If change is required before 1000 miles, oil no heavier than 10-W should be used.

At the end of the first 1000 miles, it is good insurance to drain the crankcase — when hot — and refill to the proper level.

## LUBRICATION—AFTER 1000 MILES

After the first 1000 miles the crankcase oil should be selected to give the best performance under your individual climatic and driving conditions.

## FALL—WINTER—SPRING

During the colder months of the year, an oil that will permit easy starting, at the lowest atmospheric temperature which is likely to be encountered, should be used.

**When the crankcase is drained and refilled, the oil should be selected not on the basis of the existing atmospheric temperature at the time of change but on the anticipated minimum temperature** for the period during which the oil is to be used. Unless the crankcase oil is selected on the basis of the viscosity or fluidity at the anticipated minimum temperature, difficulty in starting will be experienced with each sudden drop in temperature.

The viscosity grade of crankcase oil will, therefore, depend upon the climatic conditions under which the car is operated. The grades best suited for use in your car at the various temperatures are shown in the following table:

| If you anticipate that the minimum atmospheric temperature will be: | Use the grade indicated |
|---|---|
| Not lower than 32° F. | 20-W or S.A.E. 20 |
| As low as plus 10° F. | 20-W |
| As low as minus 10° F. | 10-W |
| Below minus 10° F. | 10-W + 10% Kerosene |

## EXTREME COLD

For territories where the temperature falls below minus 10° F. during protracted periods, 10-W oil plus 10% kerosene is recommended.

## SUMMER

The use of 20-W or S.A.E. 20 oil, rather than heavy body oils during the summer months, will permit better all-around performance of the engine, with no appreciable increase in oil consumption.

## TRANSMISSION LUBRICATION (SYNCHRO-MESH)

**Keep the transmission case filled with the lubricant recommended,** so that the oil level stands even with the opening in the filler boss on the right side of the case. Drain and flush twice a year. See Lubrication Chart in back of this book.

**Note:** If car is equipped with Buick Self-Shifting Transmission, see instruction book supplied with cars having this equipment, also Lubrication Chart in back of Owner's Manual.

## REAR AXLE LUBRICATION

The rear axle of your car is equipped with a Hypoid gear and pinion. **It must be lubricated with the proper grade of Hypoid lubricant.**

**It is extremely important tthat only Hypoid lubricants possessing the properties and characteristics necessary for the satisfactory lubrication of Hypoid gears be used in the rear axle of your car.** See lubrication chart in back of this book. Your dealer or an Authorized Buick Service Station will be glad to advise you as to the proper grade of Hypoid lubricant for use in the rear axle.

**Drain, flush and refill twice a year, but in no case should lubricant be used for more than 10,000 miles.** Use only "flushing" oils to clean Hypoid axles. Do not use gasoline, kerosene, steam, etc.

## AUTHORIZED LUBRICATION

**Your Buick Dealer is equipped to render complete lubrication service.** Lubricants are much cheaper than repair bills and should be applied regularly if you are to secure a maximum of useful service from your car.

Many Buick dealers sell a Lubrication Agreement at a special rate which will prove economical. Ask your Dealer's service man about this.



## AUTOMATIC TEMPERATURE CONTROL OF THE BUICK COOLING SYSTEM

Since a gas engine develops its power from the heat generated by the burning and expansion of gases, the important thing, from a cooling standpoint, is to see that temperatures throughout the engine are properly controlled.

It has been proven that **the engine functions best with the cooling solution temperatures ranging from 140° to 180°, although it does no harm if the engine temperature goes to *210°** under extremely hot driving conditions. We have outlined below the manner in which the cooling system operates in order that you may have a better appreciation of how to care for it to insure maximum efficiency, long life and dependability.

## WHY AUTOMATIC TEMPERATURE CONTROL?

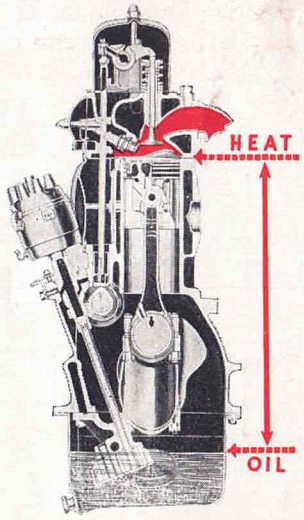
It is desirable to have automatic temperature control for the following reasons:

(a) If an engine runs too cold, it will not develop the maximum power and economy out of each gallon of fuel.

(b) If the engine runs too hot, **high temperatures generated within the engine will shorten engine life and can cause considerable damage if coolant is lost as a result of boiling.**

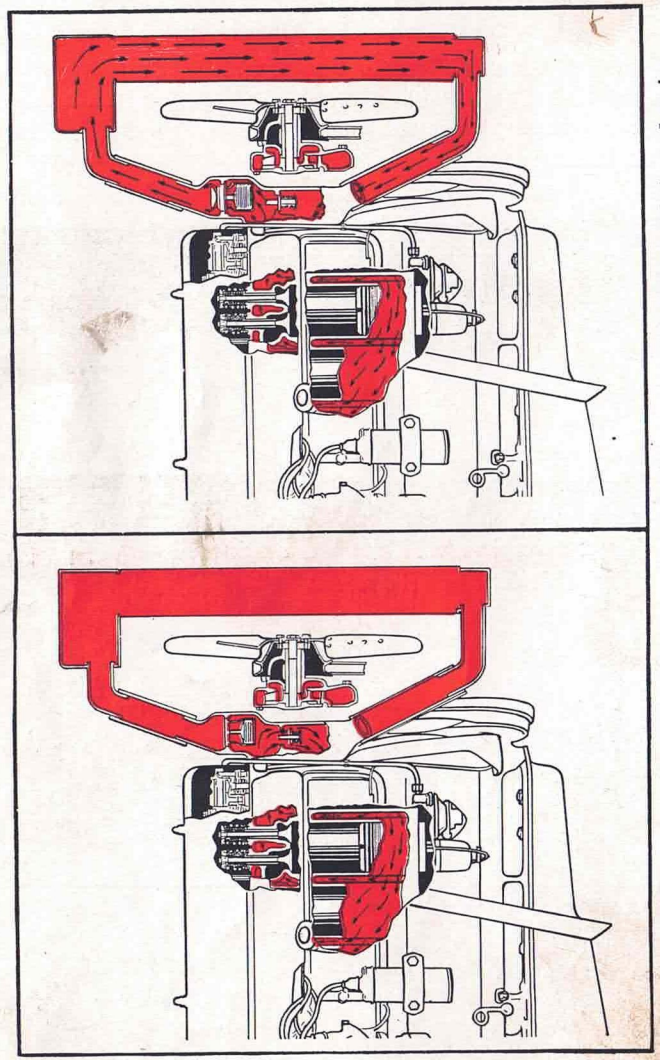
While it is necessary to have considerable heat concentrated around the combustion chamber for maximum power and economy, it is also desirable to keep other sections of the engine at cooler temperatures. The Buick Temperature Control provides a means of meeting both of these requirements in a way that will increase the life of your engine and, at the same time, give better engine performance.

Here is how the cooling system in your Buick functions: As you start the engine, the water circulates within the engine without going through the



End View of Engine

*This is based on the fact that water boils at 212° at sea level. At higher altitudes this figure is correspondingly lower



Water circulating through radiator and engine with thermostat open

How water circulates within the engine when thermostat is closed

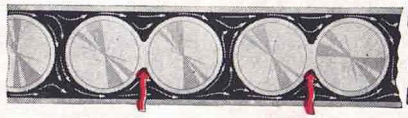


radiator. This is due to the thermostatically controlled by-pass type of water temperature control. (See illustration on page 26.)

This localizing of water circulation within the engine is desirable in order to have a quick and uniform warm-up. When a temperature of approximately 150° is reached, the thermostat just starts to open and allows the water to start circulation in a normal manner through the radiator as well as the engine. (See illustration on page 26.

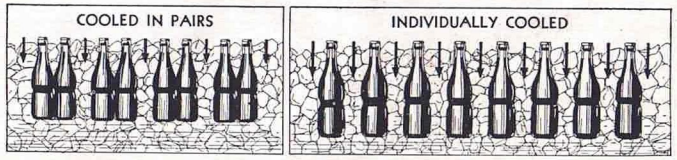
Ordinary valve seats cooled in pairs

Buick valve seats individually cooled



Cylinders cooled in pairs

Buick cylinders individually cooled

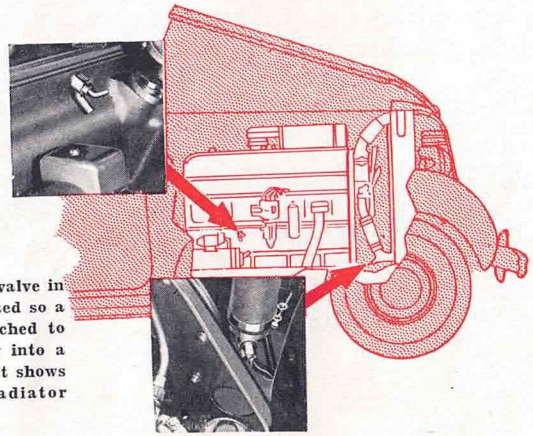



The water is kept circulating by a heavy duty water pump which is built in the front of the cylinder block and driven by a V-type belt. Note, too, how Buick cools all cylinders individually so that the correct temperature control of these important parts will be maintained. This construction is not used by all manufacturers.

Buick also individually cools all valve seats to insure uniform valve operation, as the comparative valve diagrams show. The reason for cooling valve seats individually is to give efficient valve operation and long life regardless of car speed.

## DRAINING AND CLEANING OF COOLING SYSTEM

To drain the cooling system thoroughly, **open both drain valves provided for this purpose.** One drain valve is located in the lower radiator fitting and the other in the right side of the cylinder block at the rear. **(See illustration.)**



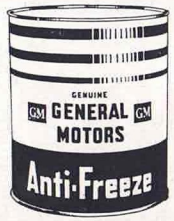
Upper inset shows drain valve in engine which is constructed so a rubber tube can be attached to save coolant by draining into a container . . . Lower inset shows drain valve in lower radiator fitting.

**It is advisable to have the cooling system drained and cleaned twice a year.** This can be done when the anti-freeze is added in the fall and removed in the spring.

**Do not use chemicals** which loosen scale unless you reverse-flush the radiator, because if scale is loosened it may plug the radiator water passages. It is best to have this method of cleaning done by an authorized Buick dealer.

Flushing with clean water is sometimes helpful in getting rid of fine rust which remains in suspension when agitated.

## ANTI-FREEZE SOLUTIONS




General Motors Anti-Freeze may be purchased from your local Authorized Buick Dealer.

Other satisfactory types of anti-freezes are available, all of which have both good and bad points. In order to provide satisfactory service they must be used in accordance with instructions issued by the anti-freeze manufacturer.

Your Buick Dealer will gladly assist you in selecting an anti-freeze which will meet with your particular requirements.



**CAUTION: Never pour cold water into the radiator when water content is extremely low and the engine hot. Such a sudden change in temperature may result in cracking the water jackets. It is advisable to allow the engine to cool for ten or fifteen minutes before adding cold water.**

## TESTING FREEZING POINT OF ANTI-FREEZE SOLUTIONS

Only a "Universal" hydrometer can be used to determine the freezing point of different types of anti-freeze solutions at various temperatures. Errors as great as 30° F. can be made unless the temperature of the solution is taken into consideration.

**When you mix various types of anti-freeze it will not be possible to read the freezing point of the mixture, so you should not start with one type and add another to the solution.**

## COOLING SYSTEM CAPACITIES

| | | |
|---|---|---|
| Special | Series 40 | 13¼ qts. |
| Century | Series 60 | 17 qts. |
| Roadmaster | Series 80 | 17 qts. |
| Limited | Series 90 | 17 qts. |

NOTE: Add 1 quart to above for cars equipped with Buick hot water heater.

The following table shows quantity of GM Anti-Freeze, Methanol or denatured alcohol required for protection to indicated temperatures:

| Freezing Point | +20° F. qts. | +10° F. qts. | 0° F. qts. | —10° F. qts. | —20° F. qts. | —30° F. qts. | —40° F. qts. |
|---|---|---|---|---|---|---|---|
| Series 40 . . . | 2 | 3 | 4 | 4¾ | 5½ | 6¼ | 7 |
| Ser. 60-80-90 | 2½ | 4 | 5¼ | 6¼ | 7¼ | 8 | 8¾ |

## USE OF RADIATOR RUST PREVENTIVES

Radiator rust preventives coat the metal surfaces in the cooling system, thereby preventing rust and corrosion which would decrease the cooling efficiency.

These **rust preventives** are available at your Buick dealer and **should be added to the radiator in the following quantities:**

| | | |
|---|---|---|
| Special | Series 40 | 3½ oz. |
| Century | Series 60 | 4½ oz. |
| Roadmaster | Series 80 | 4½ oz. |
| Limited | Series 90 | 4½ oz. |

This treatment should be repeated whenever the cooling system has been cleaned.

Practically all of the present-day **commercial anti-freeze solutions already contain inhibitors and when these are used it is not advisable to add rust preventives** as excessive amounts will cause deterioration of the rubber hose.

## ANTI-FREEZE SOLUTIONS THAT YOU *SHOULD NOT* USE

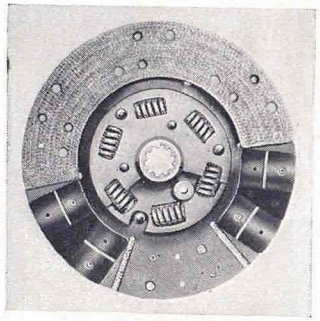
| | | |
|---|---|---|
| Salt solutions | Oils | Honey |
| Sugar solutions | Glucose | Kerosene |



# THE BUICK CLUTCH

The clutch in an automobile provides a means of connecting and disconnecting the engine from the mechanism that drives the car.

The Buick clutch is technically known as a single-plate dry disc



Clutch Disc—Cutaway

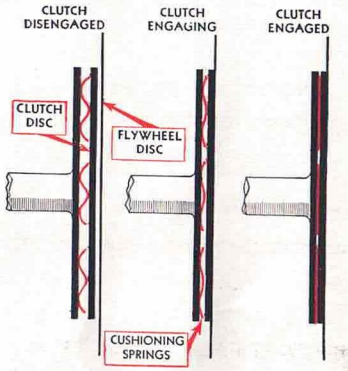



Diagram of Clutch Disc—Showing Springs

type. In this type of clutch, a number of cushioning springs are mounted between the fabric facing and the metal base. This method of construction assures a permanent "cushion" for the clutch action and contributes to soft, firm operation. The clutch assembly is illustrated in the simplified drawing above.

The accompanying illustrations show the way clutch functions, in order to help you appreciate "what to do" and "what not to do" in driving the car.

## RELEASING THE CLUTCH

In depressing the clutch pedal (see Fig. A) you force the clutch plate away from the disc which is connected to the transmission drive shaft. These parts are then motionless, although the crankshaft continues to revolve.

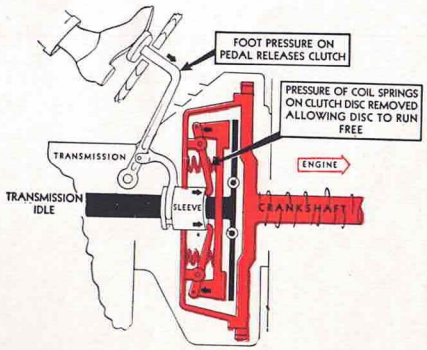



Fig. A

## ENGAGING THE CLUTCH

Removing the foot from the clutch pedal brings the pressure plate in contact with the disc. (See Fig. B.) Friction then causes the plate and disc to rotate together, turning the transmission clutch gear and, if the car is in gear, the transmission main shaft, propeller shaft, and rear wheels.

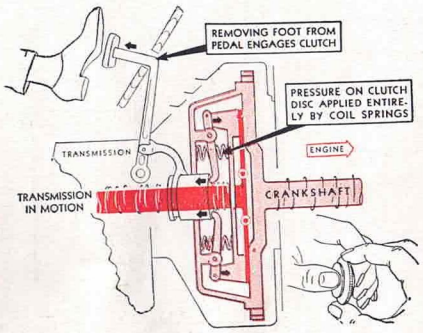



Fig. B

## PRINCIPLE OF CLUTCH OPERATION

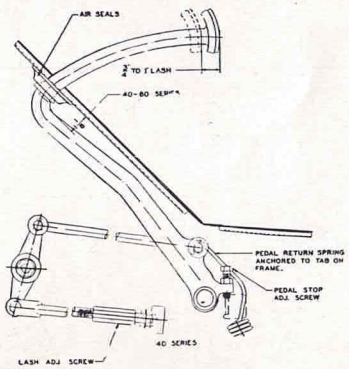
Pressing outside coins with thumb and first finger creates sufficient pressure and friction on center coin to prevent it being turned between the other two coins—this causes the three coins to turn as a unit. This is same principle of operation as the disc clutch.

## "RIDING THE CLUTCH"

**If the foot exerts a pressure upon clutch pedal without entirely disengaging it, it is generally referred to as "riding the clutch."**

**This reduces the pressure which holds the clutch plate in engagement, thereby causing it to slip — this can result in excessive heating and consequent wear of clutch facing.**

It is not necessary to use the clutch when slowing down in traffic or turning corners. It **is** important that you **do not exert pressure upon the clutch pedal except when shifting gears or coming to a complete stop.**



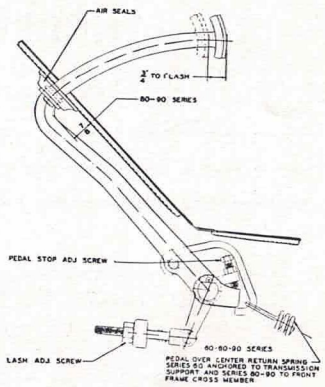

Series 40

## CLUTCH ADJUSTMENT

**There should be ¾ of an inch to 1 inch "lash" or free movement in the clutch pedal at all times.** This adjustment can be quickly made. (See illustration.)



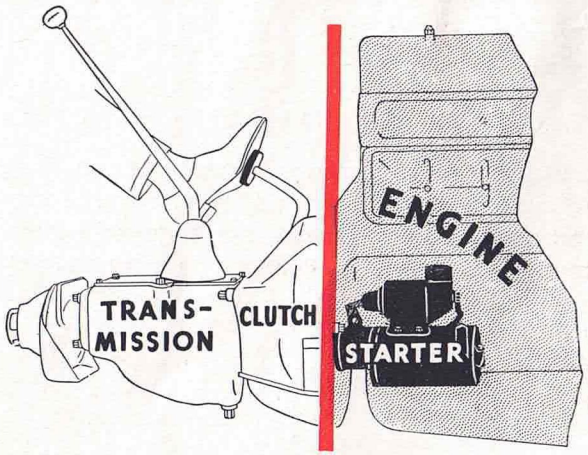
**Unless this amount of "lash" is maintained the clutch may slip, necessitating replacement of clutch parts due to excessive heat and wear.**




Series 60-80-90

## SUGGESTION

**When starting the car, especially in cold weather, it is advisable to disengage the clutch as the engine will then be relieved of the burden of turning the transmission gears. This disengagement also lessens the load on the battery.** Regardless of temperature it is a good plan to cultivate this habit and avoid any possible chance of ever starting the engine with the car in gear.




## CLUTCH RELEASE BEARING

The ball bearing which throws out the clutch pressure plate **is packed with grease when assembled and runs indefinitely without attention.**

# BUICK SYNCHRO-MESH TRANSMISSION

NOTE: Buick Self-Shifting Transmission instructions are included with each car having this equipment.

Perhaps no single feature in an automobile, has met with more popular appeal in recent years than has the Buick synchro-mesh transmission.

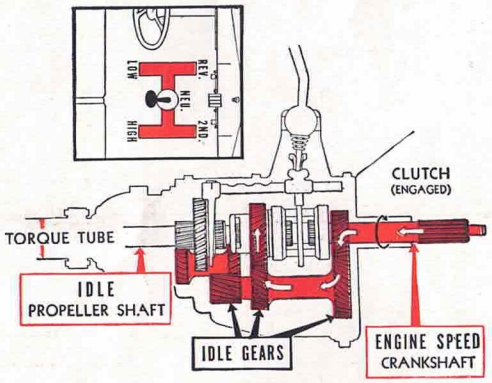
NOTE: Synchro—refers to time; mesh—to fit together. Therefore, synchro-mesh means fitting together at the proper time, that is, quietly—smoothly—without grinding.

## WHAT TAKES PLACE WHEN YOU SHIFT GEARS

Following are shown several views of a Buick transmission with gears in their various speeds. We believe this will give you a better understanding of how the transmission functions. (These illustrations are of a Series 60 transmission.)

## GEARS IN NEUTRAL

When the shift lever is placed in neutral position, the transmission idler gears run free, as indicated by the travel of arrows in the shaded gears. They are not meshed or engaged with any gears that are connected to the propeller shaft or rear axle.

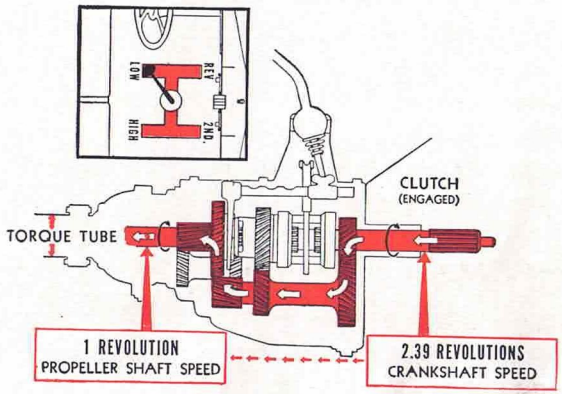



Gears in Neutral

## LOW OR FIRST GEAR

When the shift lever is placed in first or low gear it provides a drive of power to the rear axle through the shaded gears, as illustrated by the travel of arrows. The engine crankshaft then makes 2.39 revolutions to one revolution of the propeller shaft. This permits the engine to develop extra power for low speed operation.

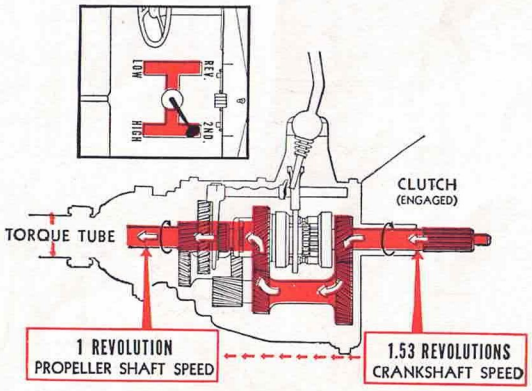





Low or First Gear

## SECOND GEAR

When the transmission lever is placed in second gear, the drive from the engine crankshaft travels through the shaded gears as indicated by arrows. In this position the engine makes 1.53 revolutions to one for the propeller shaft.

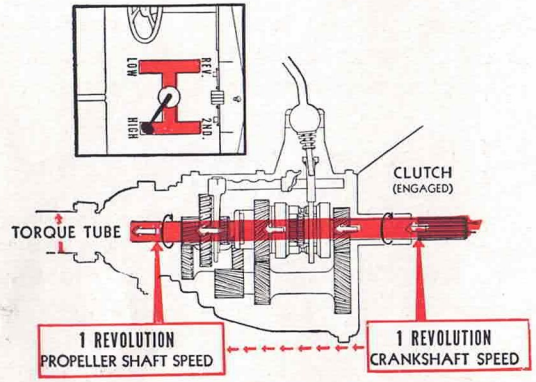



Second Gear

Therefore, the engine does not run as fast in second for the same car speed as it does in low. It is easier on the engine and transmission to shift into second gear after driving approximately twenty or thirty feet in low.

## HIGH GEAR

When the shift lever is in high gear a direct drive between the engine and propeller shaft takes place, which makes the engine crankshaft and the propeller shaft travel as a unit and at the same speed. It is desirable from an economical standpoint to shift from

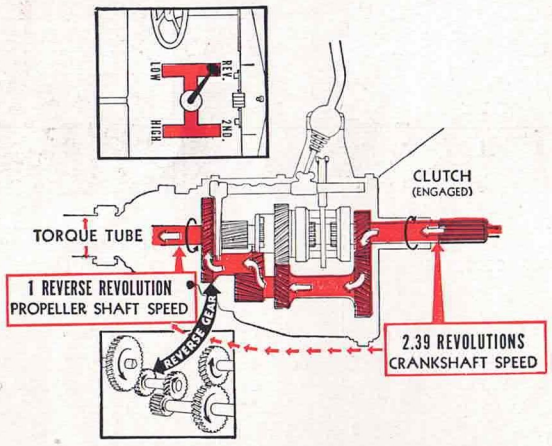



High Gear

second into high gear after the car has attained a speed of approximately 20 to 25 miles an hour.

## REVERSE GEAR

When the shift lever is placed in reverse gear the drive is from the engine through the shaded gears as indicated by the arrows. In this position the engine crankshaft makes 2.39 revolutions to 1




Reverse Gear



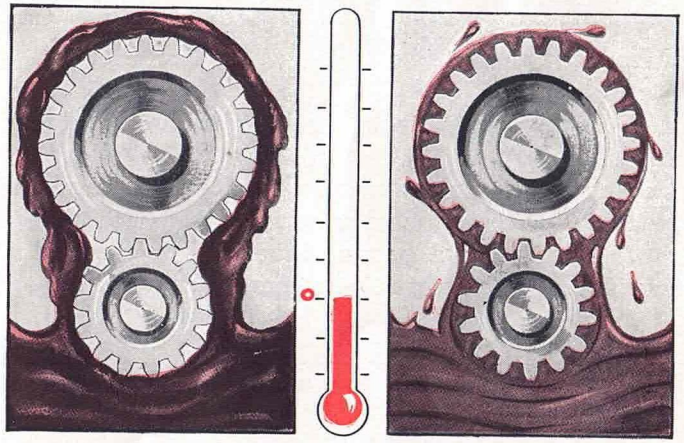
for the propeller shaft—the inset shows an illustration of how the gears mesh when in reverse gear.

## LUBRICATION OF SYNCHRO-MESH TRANSMISSION

In order that you will continue to receive smooth shifting and quiet operation for many thousands of miles, **the transmission lubricant should be drained, and the transmission flushed and refilled in the fall for winter operation and in the spring for summer operation.** See lubrication chart in back of this book.

## WINTER OPERATION

To maintain ease of shifting **in cold weather, the lubricant in the transmission should be changed to winter lubricant.** (See lubrication chart in back of this book.) This lighter lubricant will flow freely in the bearings and between the gear teeth, giving efficient lubrication of all parts and, in turn, lessening wear. Furthermore, it permits much easier cold weather shifting.



**This illustration shows how lubricant which is too heavy fails to flow between gear teeth in the proper manner**

**This shows the use of correct lubricant, providing a film of oil between gear teeth**

Perhaps you have already noticed shifting was not as easy after a drop in temperature as it was during a warm spell. The reason for this is that in cold weather the lubricant does not flow as freely into the mechanism which controls the silent shifting of your trans-

mission. It slows up the shifting and makes it more difficult to change gears.

**The transmission should be filled with lubricant to the top of filler plug opening.**

### SUMMER OPERATION

It is equally important **in the spring season to have the light lubricant removed from the transmission and replaced with summer lubricant.** This is necessary because the heavier body of this lubricant provides the necessary cushioning for the bearings and gear teeth, a requisite for long life.

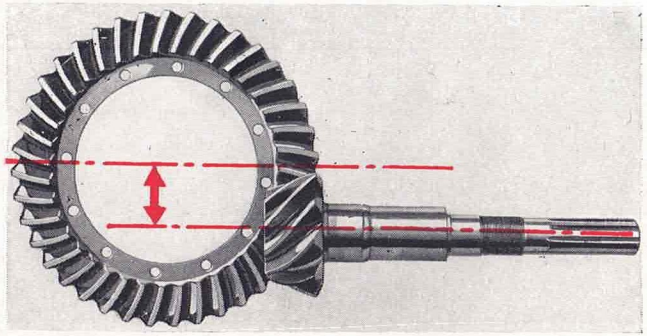
**IMPORTANT: Do not have the same type lubricant that you place in the transmission put in the rear axle of any 1938 Buick model. A Hypoid lubricant is required in the rear axle.** Detailed specifications of the lubricant required in all series Buicks are shown on the lubrication chart in back of this book.

### BUICK HYPOID REAR AXLE

The word "Hypoid" is derived from the Greek word "hypo" meaning lower, and as applied to rear axles means that the center line of the drive pinion is below the center line of the ring gear. (See illustration.)

All 1938 Series Buick cars are equipped with Hypoid rear axle gears.

This construction permits lowering the floor line without resorting to the use of a large tunnel or hump. In addition, the relative tooth strength is greater, bearing loads are decreased and the gear itself is fundamentally quieter than the conventional type.



Hypoid axle gears



## BUICK BRAKES

The increased speed of modern cars has made motorists more conscious than ever of the need for good, efficient brakes that insure fast and positive stopping.

The new Buick is equipped with the latest type of hydraulic brakes. These brakes are so engineered and constructed that smooth, quick stops can be accomplished with scarcely any effort on the part of the driver.

The following outline briefly describes the operation and construction of these brakes and tells how to care for them to insure maximum braking efficiency and long life.

### HOW BUICK BRAKES OPERATE

(See illustration)

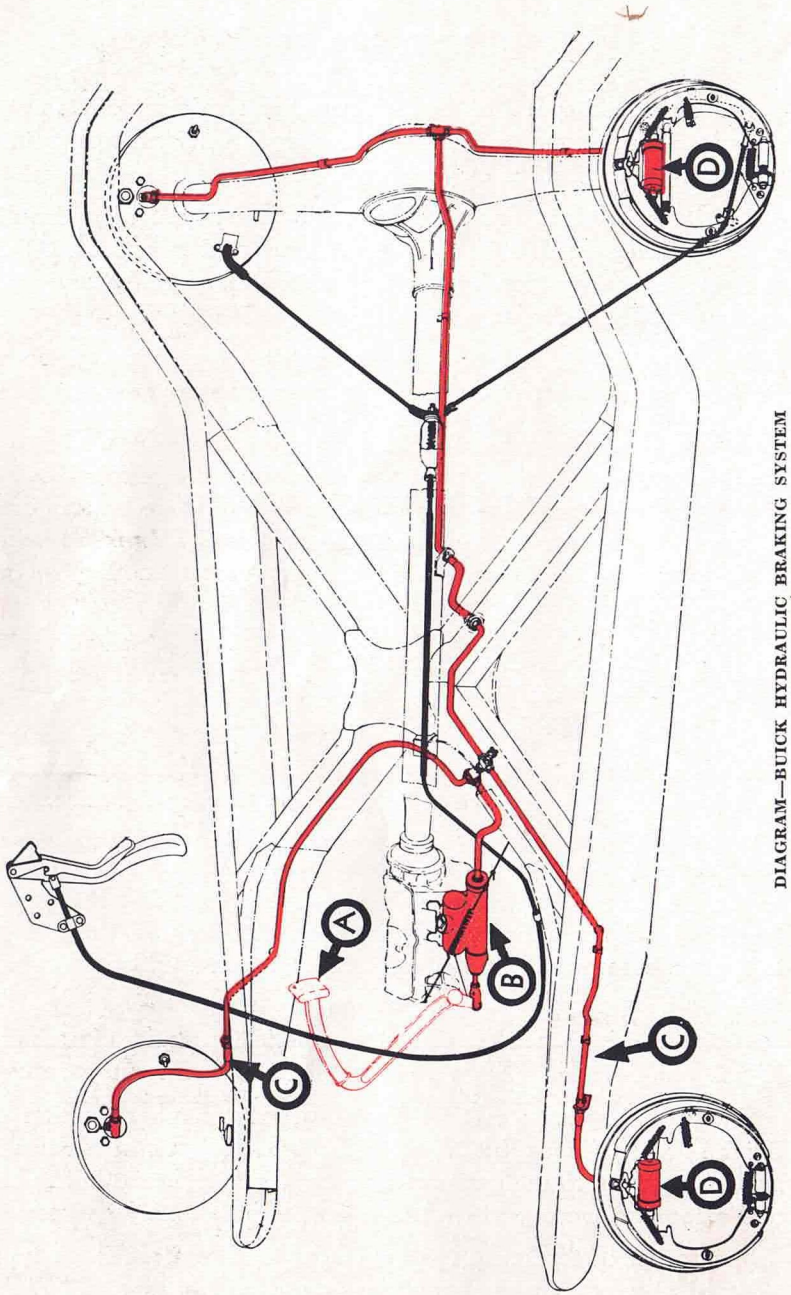
As pressure is exerted on brake pedal "A," fluid in the master cylinder "B," is forced through the metal tubes and non-expanding hose "C," to the wheel cylinders "D," where it presses against the pistons. As these pistons move outward they force the brake shoes against the brake drum. The resulting friction stops the car.

**It is important that the master cylinder be always slightly more than half-full of fluid. When refilling the master cylinder, use General Motors or Delco hydraulic brake fluid of the proper number. Your Buick dealer will gladly give you this information.** These fluids are blended in such a way that they do not corrode metal parts or harm the connections or seals. They will flow freely in the coldest weather and yet will not evaporate under a tropical sun.

**Do not use a mineral base oil. The smallest quantity of such an oil will cause the rubber seals to swell and become inoperative.**

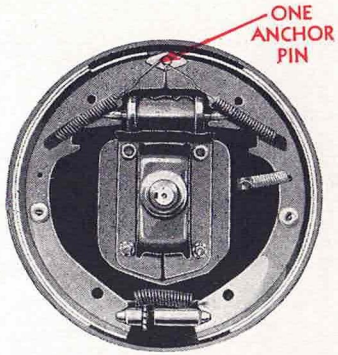
You probably have noticed the unusual soft pedal action of Buick brakes. This is due to their scientific design and such care has been given to their construction that longer brake lining life and smoother, more positive brake action is definitely assured.

Illustration at top left on page 41 shows the latest Buick type hydraulic brakes. Note that only one anchor pin is used. Right top on page 41 shows the ordinary hydraulic brake in which two anchor pins are used.

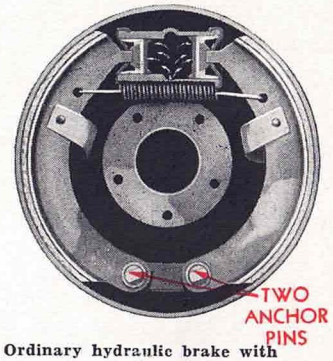



DIAGRAM—BUICK HYDRAULIC BRAKING SYSTEM






Buick hydraulic brake assembly with one anchor pin

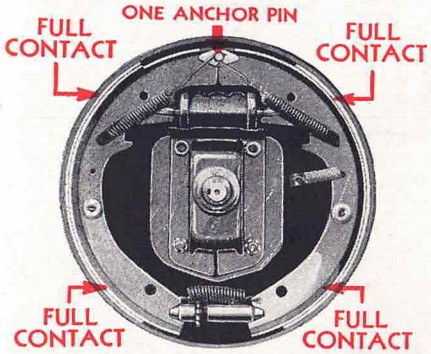



Ordinary hydraulic brake with two anchor pins

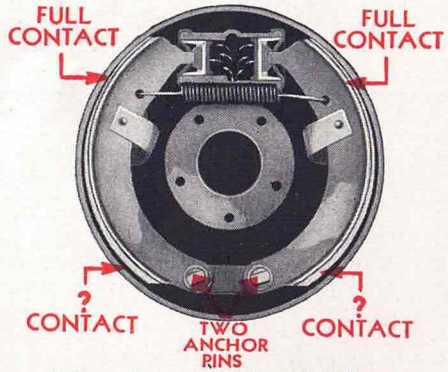
Due to this single anchor pin design, the shoes in Buick brakes have a "self-centering" action in the drum when the pedal pressure is applied. The two shoes are linked together at the bottom and thus work as a single unit in building up a powerful braking force. This results in uniform lining wear and unusual softness of brake action.

Illustration at left below shows the full contact of Buick brake shoes with the drum at the top and bottom after a car has been in operation for thousands of miles.

Illustration at right below shows an ordinary hydraulic brake after many miles of operation. Note how the use of two anchor pins results in greater lining wear at the top of the shoes where the full contact is made. Note, too, the absence of contact at the lower part of the shoes.




Buick brake with full shoe contact at top and bottom

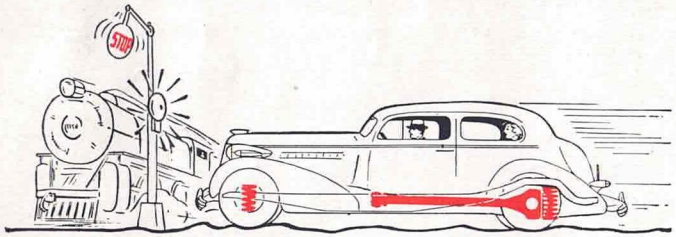



Ordinary hydraulic brake with full shoe contact at top only

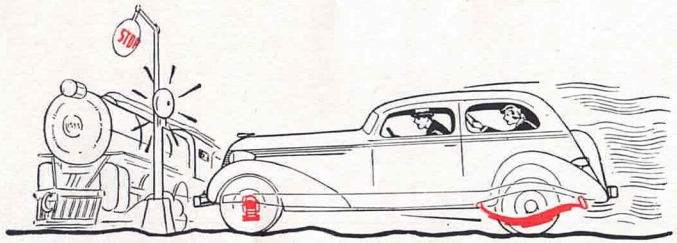
Whether a Buick has been driven 100 miles or 20,000 miles the lining will maintain full contact with the drum, thus insuring uniform wear and greater economy of operation.

Buick engineers drove hundreds of thousands of miles in their test runs in developing the best combination of brake linings that would give the long life and dependable service so much desired by car owners. **Therefore, if, after a long period of time, your brakes require new linings, be sure and insist on Genuine Buick brake linings, which can be obtained from your Buick dealer.**

Buick replacement linings are ground to fit the drums so that, when placed on a car already in service, they will immediately give the same full contact that they would in a new car.




**In the New Buick, the torque tube and knee-action arms absorb all braking loads**

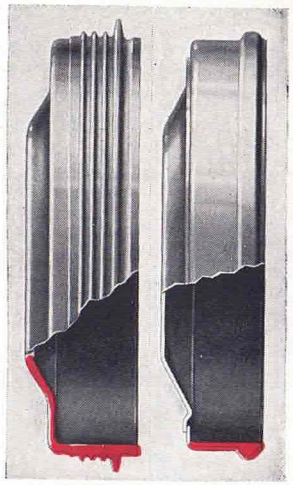



**In the conventional car, the burden of all braking loads is placed on the springs**

Additional life is built into the braking mechanism through the use of drums with cast-iron surfaces. Cast-iron provides the finest surface upon which a brake shoe can operate and it is also less subject to scoring and distortion than a conventional steel type drum.



Still another feature which helps provide the smooth gradual stop you experience in your Buick is the combination of knee-action wheels with a torque tube drive.



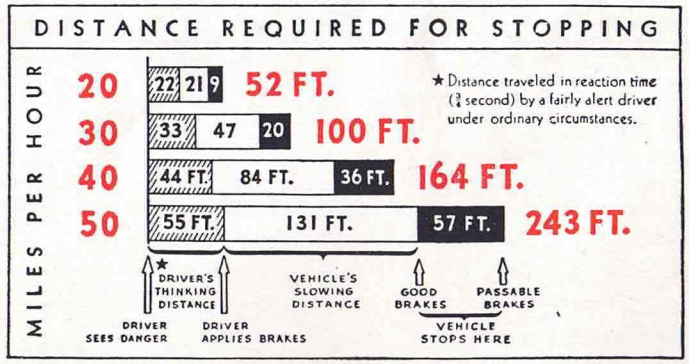
**Series 80-90 Series 40-60**
**Brake Drums**

This combination absorbs all braking strains, thus leaving the springs free to perform their one main job — that of cushioning the car and its passengers. It results in smooth stopping of the car without abnormal pitching or tossing of the passengers.

On the opposite page is an illustration of a conventional car, in which the springs are called upon to absorb all braking twists in addition to cushioning the car. This tends to pitch the car forward on the springs when the brakes are quickly applied.

Remember that Buick has had more years of experience building four-wheel brakes than other car manufacturers. As a result, your Buick has the finest combination of brake drums, shoes, linings, backing plates and hydraulic control.

The diagram below gives you an idea of the distance traveled at various speeds from the time a driver senses the need of brake application until the car is brought to a stop.

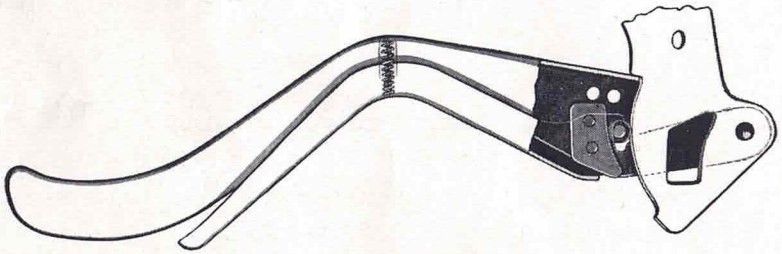


It is well to remember the following facts regarding the Buick braking system.

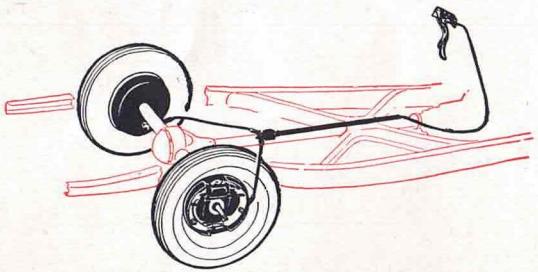
1. **The fluid level in the master cylinder should be checked at every lubrication period and fluid added if required.**
2. **If the brake pedal has a soft, spongy feeling, the system should be "bled."**
3. **The brakes require adjustment or additional fluid in the system if, when the pedal is fully depressed, it is less than two inches from the floor board. For high speed or driving on hills, this figure should be three inches.**

### THE BUICK PARKING BRAKE

In addition to the powerful hydraulic service brakes, Buick also has a parking brake which exerts direct pressure on both rear wheels. (See illustrations.)



Buick's New Parking Brake Lever



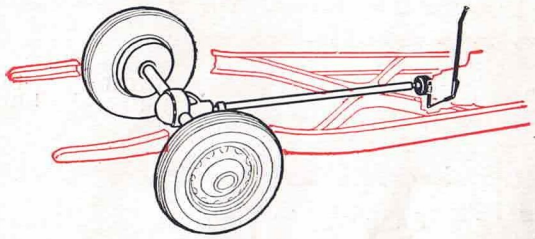
Buick parking brake, because of its location (illustrated above) exerts a powerful braking force DIRECTLY to both rear wheels



Buick not only seals and protects the service brakes, but also the parking brake. This assures you of safe, dependable service in all kinds of weather.

The latch on the parking brake handle is a cam and roller type, eliminating the use of a ratchet.

Buick parking brake (illustrated on page 44) exerts a powerful braking force **directly** to both rear wheels.



Above, outline of exposed type parking brake located at rear of transmission

Above, outline of exposed type parking brake located at rear of transmission, used on some makes of cars.

## TIRES AND THEIR CARE

### TIRE PRESSURES

Correct air pressures for Buick's large, low pressure tires:

| Series | When tires are cold Front | When tires are cold Rear | While tires are hot Front | While tires are hot Rear |
|---|---|---|---|---|
| 40-60 | 23 lbs. | 28 lbs. | 25 lbs. | 32 lbs. |
| 80-90 | 25 lbs. | 30 lbs. | 27 lbs. | 34 lbs. |

Because of the large size of the tires a slight variation in pressure will make quite a difference in the handling of the car and the mileage that you get from the tires. **It is recommended that you check air pressures once a week.**

### PROLONGING TIRE LIFE

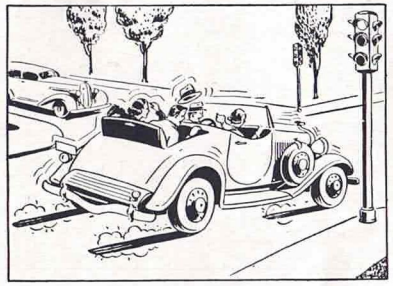
If the center of the tread seems to show very little wear while the outer edges show noticeable wear, it indicates driving on under-inflated tires. When tires are under-inflated the center does

Tire Wear—Under-Inflation

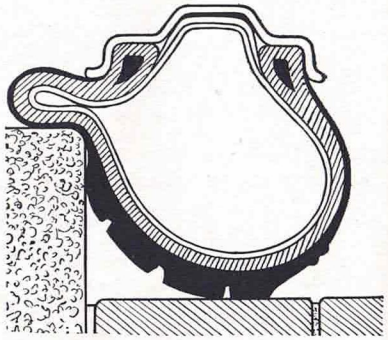
Tire Wear—Over-Inflation

not carry its share of the weight. In other words, the tire "rides on the shoulder."

The life of a tire depends largely upon the conditions under which the car is driven. The careful driver will obtain much more mileage from his tires than will be obtained by a severe driver.



Improper use of brakes



Under-inflated tire causing rim bruise

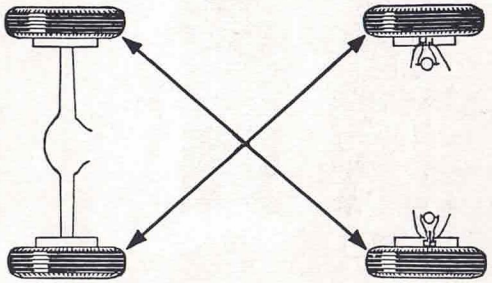
Quick application of the brakes when approaching a stop light and jerky get-aways cause excess wear on tires. Therefore, it is obvious that the thing to do is to make gradual stops and starts if you want good tire mileage.

Care should always be used in parking. Scraping tires against the curb will weaken the side walls. This, of course, invites blow-outs and shortens the life of tires.



## IRREGULAR TIRE WEAR

Irregular tire wear is usually due to incorrect pressure, improper front wheel alignment, and to the different conditions under which front and rear tires operate. To correct for wear due to under-inflation or alignment, the cause must be corrected. **To overcome wear due to different conditions under which front and rear tires operate, wheels should be "switched" (without dismounting the tires) from right front to left rear, left rear to right front; left front to right rear, right rear to left front, approximately every 5000 miles. This is known as crossing tires.**



"Switching" tires

Uneven tire wear frequently causes tire noise which is improperly diagnosed as rear axle noise. "Crossing" will minimize tire noise. In the section entitled "For the Mechanically Minded" you will find instructions for testing for tire or axle noise under "Tire Noise vs. Rear Axle Noise."

## TIRE AND TUBE BALANCE

Rubber balancing pads are often used on factory-installed tubes to provide proper balance of tire and tube assembly. These pads, while similar in appearance, should not be confused with or considered as the ordinary puncture patch.

In order to maintain original tire and tube balance, it is necessary to reinstall tubes in the same casings with the valve stem in line with balance mark on casing. It is important that wheel and tire assembly be re-balanced after repairing of punctures.

## TIRE CHAINS

**Any of the conventional full-type non-skid tire chains can be used on the rear wheels of your Buick.**

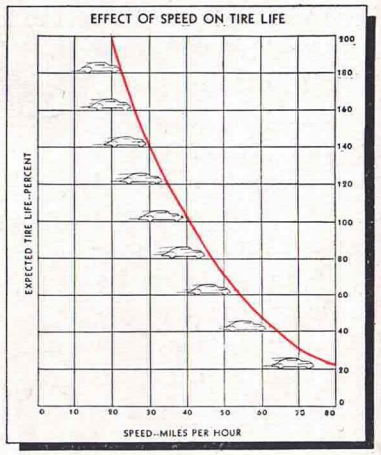
**Do not use tire chains on the front wheels under any circumstances because they will interfere with the steering mechanism.**

## HOW TO CHANGE TIRES

**(See instructions under section entitled "For the Mechanically Minded.")**

## THE EFFECT OF SPEED AND HEAT ON TIRE LIFE

The accompanying chart is supplied from records obtained from The Rubber Manufacturers' Association. It presents a composite picture of how tire life is affected by heat and high speed operation. From this it can be seen that tire wear is much greater when driving at high speeds. Tires also wear faster in summer than in winter.



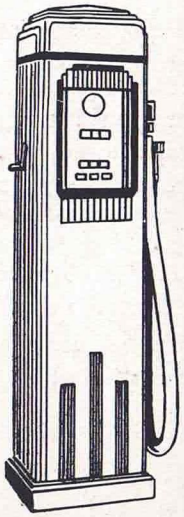

Tire Wear Chart

# FUEL SELECTION AND ECONOMY

## GASOLINE SELECTION

Buick cars are designed to operate economically on any good grade of gasoline.

**In the selection of gasolines, you have at your option fuels that will permit you to operate with satisfactory performance and fuels that will enable you to just get by. Although your Buick will operate with either type of fuel, tests have shown that a good grade of fuel is the most satisfactory in the long run.**



In some parts of the country, especially in the winter, gasolines are marketed which are very volatile; that are generally advertised as "easy starting gasolines." Such gasolines, however, are not necessary in your Buick since the automatic choke has been designed and calibrated to provide easy and positive starting with fuels of ordinary volatility, but if you wish to use



volatile gasolines your Buick service man can reset the Volatility Selector in a few seconds to give normal starting. See Octane Selector, pages 51, 79.

## FUEL ECONOMY

Regardless of competitive claims, Buick stands pre-eminent in power, speed and economy, all factors considered.

For your information we are reprinting gasoline mileage figures obtained from tests at the General Motors Proving Ground. These tests are made at fixed speeds on level roads with no tail or head winds and without accelerating or decelerating. **These figures indicate the mileage obtained on "test runs" and the maximum which you could obtain under similar conditions. They must not be confused with "average mileage."**

| Series | 30 M.P.H. | 50 M.P.H. | 70 M.P.H. |
|---|---|---|---|
| 40 | 20.0 | 16.5 | 13.0 |
| 60 | 17.5 | 15.5 | 12.0 |
| 80 | 16.5 | 14.5 | 11.0 |
| 90 | 15.5 | 13.5 | 10.5 |

Owners operating their cars conservatively with fairly open driving conditions could approximate these figures. Others driving in congested city traffic with frequent starts and stops may not obtain sixty per cent of this mileage.

**The chief factors influencing gasoline consumption are: High speed, rapid acceleration, accelerating or driving too long in low or intermediate gear when getting under way, and too frequent changes of speed. Each time the accelerator pedal is depressed extra fuel is pumped into the manifold.**

**Speed is, of course, the greatest contributor to low gas mileage.** Air resistance increases as the square of the speed. For instance, a car going sixty miles an hour must overcome air resistance four times as great as when going thirty miles an hour. At eighty miles an hour the resistance is over seven times as great as when going thirty miles an hour.

Over seventy-five per cent of the power required to drive a car eighty miles an hour is used in overcoming air resistance, while

at thirty miles an hour only thirty per cent of the power required is used to overcome air resistance.

## ECONOMICAL ADVANTAGE OF THE BUICK AUTOMATIC CHOKE

Buick's automatic choke contributes to economy by providing just the right mixture when starting. It protects the car owner against three distinct disadvantages:

1. The excessive use of fuel from too rich a mixture.
2. The removal of lubricant from the cylinder walls when the mixture is so rich that unburned gasoline runs by the pistons.
3. Excessive use of the starter and consequent drain on the battery.

## ECONOMICAL ADVANTAGE OF THE BUICK OCTANE SELECTOR

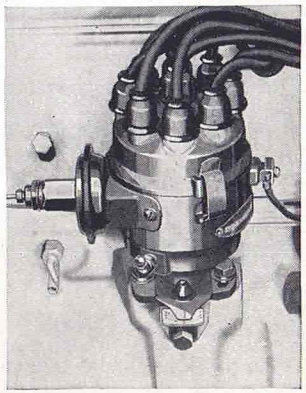
The octane selector is an arrangement on the distributor to adjust the spark timing for the "octane rating" of the gasoline used without having to check the timing after it has been originally set, making it easy to retime the spark for any grade of gasoline.

The Series 40 are set at the factory for regular grades of gasoline while the Series 60-80-90 are set for "premium" gasolines.

Should a Series 40 owner desire to improve his performance by using "premium" gasolines, the Octane Selector should be moved to a slightly advanced position. (Two marks on selector, which would be 4° at flywheel, will be about right.)

An owner of a Series 60, 80 or 90 car who desires to use a low grade fuel should set the Octane Selector on the low side to reduce the "ping" to a point where it is not objectionable.

The Octane Selector not only allows low anti-knock fuels to be used without detonation, but enables the owner to get maximum performance with "premium" gasolines by taking full advantage of the high anti-knock rating of these fuels.



Distributor and Octane Selector



Complete instructions for correct setting of the Octane Selector will be found under section entitled, "For the Mechanically Minded." **To obtain maximum economy, do not move the pointer towards "low" any more than is necessary. All cars should have a slight "ping" with either low or high octane fuels for best performance.**

## SUGGESTIONS FOR OBTAINING MAXIMUM ECONOMY

1. Depress the accelerator easily and only in proportion with speed required.
2. Acceleration over 20 to 30 miles per hour in second gear accomplishes very little toward fast "pick-up" but does use an excessive amount of gasoline.
3. When coming to a stop light — coast toward it with the throttle fully closed.
4. Driving with under-inflated tires causes excessive tire wear and the "drag" produced, handicaps fuel economy.
5. Don't idle the engine for a long period of time.
6. Keep the engine tuned for maximum efficiency. **The greatest economy can be maintained by having the engine tuned each 5000 miles.**
7. Use the correct grade of engine oil for winter and summer operations, as shown in the chart on page 24. **Maintain oil level at "Full" mark on measuring gauge at all times.**
8. Keep the proper amount of cooling solution in the radiator summer and winter. An over-heated engine causes rapid wear of engine parts.
9. High speed driving is not economical on gas, oil or tires.
10. Moderate speeds on rough roads lessens the impact strains on the tires and all other parts of the car. Careful driving prolongs the life of all car parts and increases overall economy.

## SAFETY MEASURES

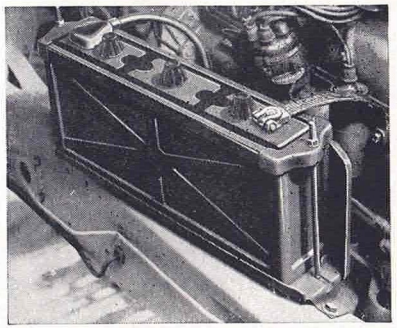
For safety's sake, your Buick is equipped with everything that sound engineering practice recognizes as practical aids to safer driving.

Such features as Buick Hydraulic Brakes, Bull's Eye Steering, Center-Point Steering, Knee-Action Wheels, and front and rear stabilization are typical of the extent to which Buick engineers have gone to assure your safety.

# THE BUICK ELECTRICAL SYSTEM

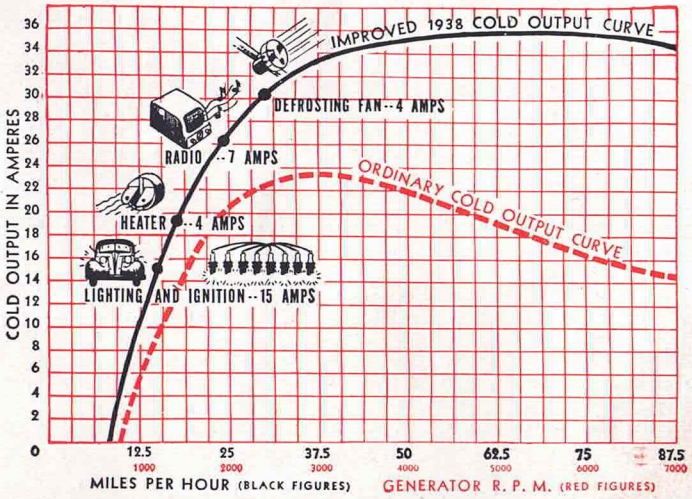
## BATTERY

**The battery is placed under the hood on the right-hand side where it is very accessible.** The battery is filled with an acid solution from which the water slowly evaporates, making it necessary for fresh distilled water to be added to each of the three cells at regular intervals to bring the level about three-eighths of an inch above the plates. **The water level should be checked at least every 1000 miles and, in warm weather, every 500 miles, or at least every two weeks.**



Battery Location

Hydrant or well water is not satisfactory since it is very apt to contain impurities. In freezing weather, after adding water to the storage battery, run at charging speed for at least an hour to mix the water thoroughly with the acid. If this is not done, the water is likely to stay on top of the acid solution and may freeze, causing damage to the battery.




This illustration shows the great reserve capacity of the new Buick generator



## BATTERY WARRANTY

**By registering the Delco battery in your new car, you may obtain an adjustment policy certificate and enjoy the privilege of pro-rated protection for 21 months or 21,000 miles. Your Buick Dealer will gladly supply you with complete information regarding this Service Policy.**

## GENERATOR

Buick provides a heavy duty air-cooled generator capable of producing sufficient current to supply all the normal electrical demands. The generator is mounted at the front of the engine on the left side and is driven by a V-belt which also drives the water pump. It should be examined each 1000 miles for damage and proper adjustment. **Instructions for tightening this belt will be found in the section entitled "For the Mechanically Minded."** The generator charging rate is automatic, being controlled by the amount of current used and the state of charge of the battery. When the battery is partially discharged, the charging rate is high, and when it becomes fully charged, the charging rate is lowered automatically. If the pointer on the charge indicator is observed to flutter at times, this is no cause for alarm, but simply an indication that the automatic voltage regulator is cutting "in" and "out" because the battery is in a fully charged condition.

## LIGHTING CIRCUIT

There are no fuses in the lighting circuit (except in the dome light circuit on the Series 80-90 cars). Protection for the lighting circuit is through a thermostatically controlled current limit relay attached to the light switch. When the current load is too heavy, due to a short circuit, this relay opens and closes rapidly, thus reducing the current sufficiently to protect the wiring from damage. This action continues until the cause is eliminated.

This is an important safety feature, for when a short circuit does occur, the lights are not completely extinguished, as is the case when a fuse blows. During this action of the relay there is usually sufficient light to permit the car to be driven to the nearest service station. If a short circuit should occur, it is well to have it repaired as soon as possible, otherwise it will result in the battery becoming completely discharged.

## HEADLIGHTS

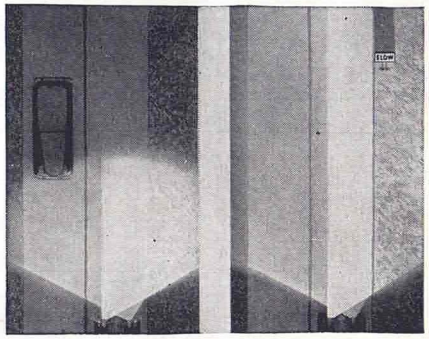
Buick provides a headlighting system which offers a maximum of safety and convenience to the driver. There are three conditions

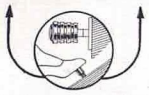
of driving, each of which requires different performance from the headlamps. These are as follows:

1. **Fast driving on straight clear roads—free from traffic.**
2. **Fast driving on straight roads—meeting other cars.**
3. **Conservative driving on winding roads meeting other cars and driving on well-lighted streets.**

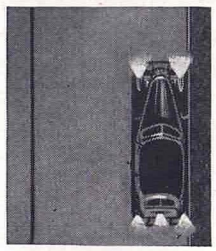
Buick has recognized that it is not possible to meet all of these conditions with a single beam, or even two beams. Therefore, the Multi-beam system has been designed to insure the motorist maximum safety by enabling him to conveniently select a type of illumination to meet these driving conditions.

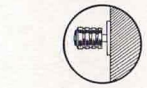
By pulling the light button on the instrument board to the last position, either the elevated far-reaching beam to meet the conditions of fast driving on straight roads, or the passing beam is obtained alternately by operating the foot switch. With the light switch button in this position the passing beam results from tilting down the beam on the left-hand side of the road which thus protects the approaching motorist from glare. The beam projected to the center and right-hand side of the road is retained in its elevated position, thus revealing the roadway a much greater distance ahead than would be possible if both beams were fully depressed. **When both beams are elevated the red pilot bulb in the center of the instrument cluster will be illuminated, making it convenient for the driver to determine which beam is in use.**



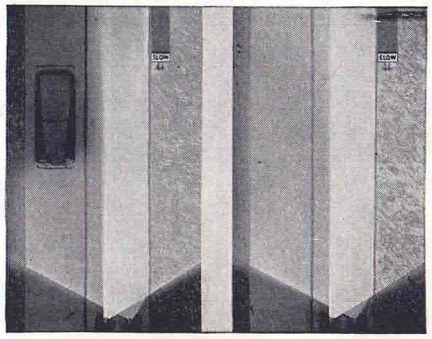


City lower beam City upper beam





Buick parking lights



Country passing beam Country driving beam



By pushing the light button "in" one position, the beams from both lamps can be either elevated for the straight stretches, or depressed for meeting other cars by operating the foot switch. This is the combination that should be used when driving at slower speeds on roads with frequent curves, as this affords the approaching driver maximum relief from glare under such conditions, and assures maximum safety to both the driver and the approaching motorist.

**When either the partial or fully depressed beams are in use the fender lamps are also lighted.** These serve to outline the full width of the car with the result that approaching motorists allow additional clearance in passing.

**It is important to use only genuine Multi-beam lens and the right or left lens as required.**

To obtain maximum results in road illumination and the safety which has been built into headlighting equipment, headlamps must be properly aimed. **Headlamp adjustment should be checked at frequent intervals and particularly following replacement of burned-out bulbs.**

## PARKING LIGHTS

The fender lamps are also utilized for parking as well as clearance lights. When the switch button is pulled out to the first latching position these lamps, as well as the tail lamps and license plate lamp, are lighted.

The fender lamps consume a very small amount of current, thus minimizing the current consumed while the car is parked.

The projecting lenses on the fender lamps, and tail lamps, make the car visible from the side as well as front and rear.

**For instructions on replacement of bulbs and cleaning reflectors see section entitled, "For the Mechanically Minded."**

### INSTRUMENTS AND INSTRUMENT BOARD

**A red pilot lamp located on the upper face of the panel indicates whenever the bright lights (upper beams) are in use.**

The glove compartment, on the right-hand side, presents a pleasing balance for the instrument panel. The door of the glove compartment is provided with a lock and has a medallion which is removable to permit the installation of a special Buick electric clock having the same type of illumination as the instrument panel.

The arrangement of instruments and controls is illustrated on page 7.

### IGNITION SYSTEM

**It is well to have the ignition system checked at the beginning of cold weather to insure easy starting during the winter months. Instructions on the ignition system will be found in the section entitled "For the Mechanically Minded." This check is included in the Engine Tune-Up recommended each 5000 miles and under "Every Fall," page 10. Further instructions are described under "For the Mechanically Minded."**

### HORNS

Electrically-operated dual horns tuned to a harmonious blend of a high and low note are mounted under the hood.

The horn ring is recessed into the spokes of the wheel to prevent accidental blowing.

## OPERATING THE BUICK RADIO

A good radio properly operated will give the utmost in radio reception, while the same radio improperly operated may be quite unsatisfactory.

Before operating the Buick radio the following suggestions should be read in order to take advantage of the various controls incorporated in this receiver for reproducing the programs to suit the individual preference.



### SWITCH AND VOLUME CONTROL—LEFT KNOB

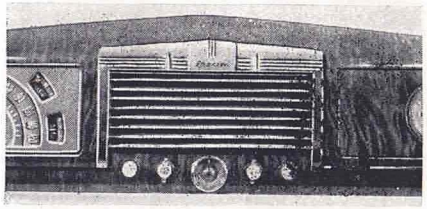
The first portion of rotation in a clockwise direction turns on the radio. Further rotation increases volume.

### TONE CONTROL—CHROME PLATED LEVER BEHIND THE VOLUME CONTROL KNOB

Control in extreme "treble" position gives brilliant reproduction of full tone range. This position will reproduce speech very clearly and distinctly. Rotation counter-clockwise (towards "bass") diminishes brilliance and accentuates low notes.

### TUNING CONTROL—RIGHT KNOB

Good tone quality on any radio depends upon accurate tuning. If the program sounds screechy or distorted, it is very probably caused by improper tuning and can be corrected by adjusting the tuning control knob slightly. Since the low notes are more affected by tuning, than the high notes, it is a good plan to tune the set to a point where the low notes are heard the best and the high notes are clear but not screechy. Turning the control knob back and forth until the station is almost lost on either side will enable the operator to hear the different kinds of reception and select the position where the reception is the best.



Radio Grille and Controls

When passing under steel bridges or in areas where the radio waves are shielded, a distant or weak station sometimes fades. Also the presence of power lines or other electrical disturbances nearby will tend to cause excessive noise in the radio. Improper tuning magnifies both of these effects.

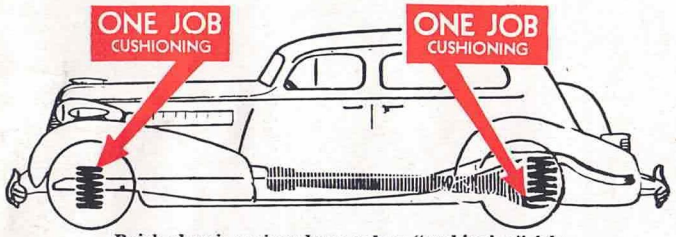
### LOCAL-DISTANCE SWITCH—CHROME PLATED LEVER BEHIND TUNING CONTROL KNOB

When the switch is in the "distant" position all the power available in the set is being used, thereby increasing its ability to receive distant stations. In areas where the signals are sufficiently

powerful the switch may be turned to the "local" position which reduces the noise between stations which is sometimes objectionable when tuning from one station to another. Usually the switch will be used in the "local" position only in communities where power line or street car interference is bad. Whenever possible the set should be operated with switch in "distant" position.

## RIDING COMFORT

In order that you may better enjoy the exceptional riding qualities of your new Buick, it is well to have an understanding of the various units which make this ride possible in order that you may keep each part functioning at the peak of its efficiency.

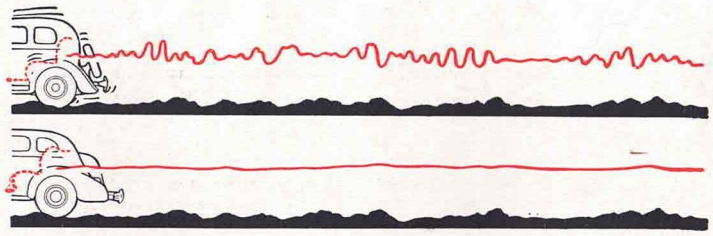



**Buick chassis springs have only a "cushioning" job**

There is a very sound engineering principle which is responsible for the ease of handling and the riding qualities which you will find in your new Buick. The exceptional roadability of this car is made possible by the combination of knee-action wheels with torque-free springing.

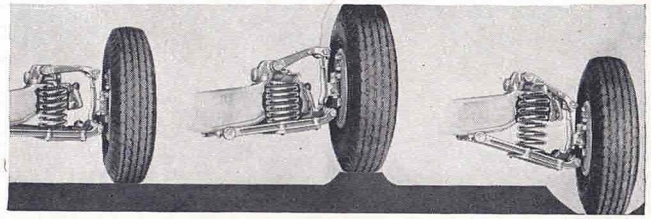
### BUICK KNEE-ACTION

To get away from the pitching motion experienced by the old-fashioned type of front springs, Buick designed and perfected the knee-action wheels which give the even ride illustrated below.





Knee-action wheels relieve the front springs of all braking and steering loads, making it possible to design the front coil springs for only one job — that of cushioning the car and its passengers. Furthermore, with the front wheels mounted independently, each front wheel can rise or fall when going over rough roads without disturbing the car's balance, as illustrated below.

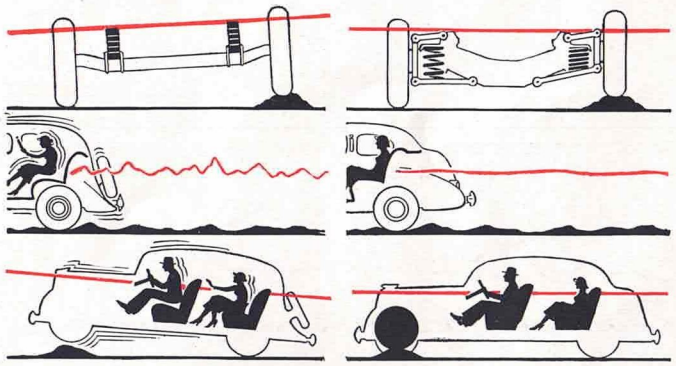


**Three positions of Buick's Knee-Action**

You can see from the above picture that the two big V-shaped arms at each wheel are the only points that will require lubrication at regular intervals. **These arms should be lubricated every 1000 miles** in order to have the maximum freedom of movement which is so important to riding comfort.

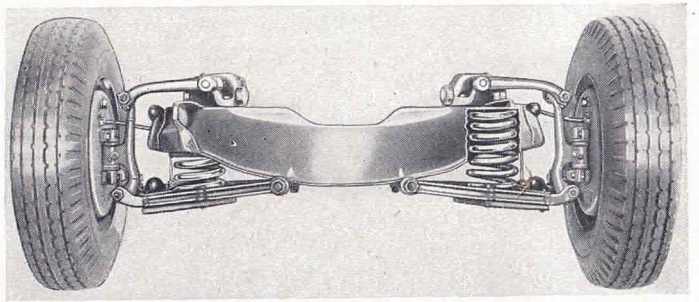
Because the spring is of a coil type it will not require lubrication and will always maintain the same degree of flexibility. Mud, snow, rain and ice will not affect the operation of these springs.

Here is a comparison of Buick knee-action wheels with the ordinary method of springing. Knee-action holds the car at an even keel when going over bumps. This is not possible with conventional springing.



**Above is shown results of ordinary springing with solid I-beam construction. Note the pitching motion of car.**

**Here is shown result obtained thru use of independent front wheel suspension with Torque-Free Springing.**



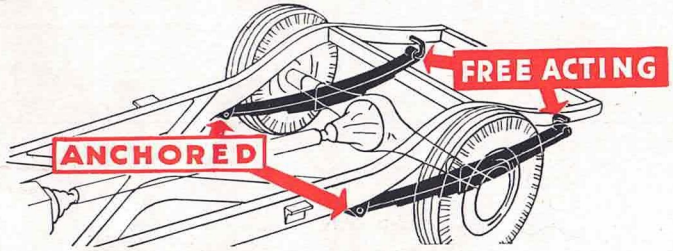
**Detail view of Buick's Independent Front Wheel Suspension**

With conventional springing the front springs must absorb all braking and steering strains in addition to cushioning the ride. This extra work thrown on the springs necessarily results in a sacrifice of riding comfort.

## THE BUICK REAR SPRINGS

The first to use coil springs on the front to obtain their superior riding qualities, Buick is now the first to secure a uniformly balanced ride by using coil spring on the rear. Buick's time-proven principle which absorbs driving and braking efforts through a torque tube, has made possible this outstanding contribution to riding comfort.

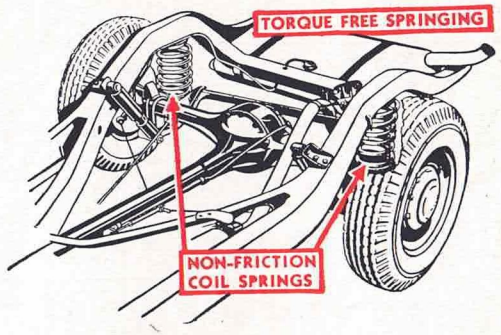
For comparison, both types of construction are shown below.




**In some cars the rear springs are free acting or shackled only at the rear —front half of spring pushes car**

Buick rear wheels will not chatter on a sudden application of the brakes regardless of whether the road is hard and smooth, rutted, gravel, or choppy. Because there is no friction in a coil





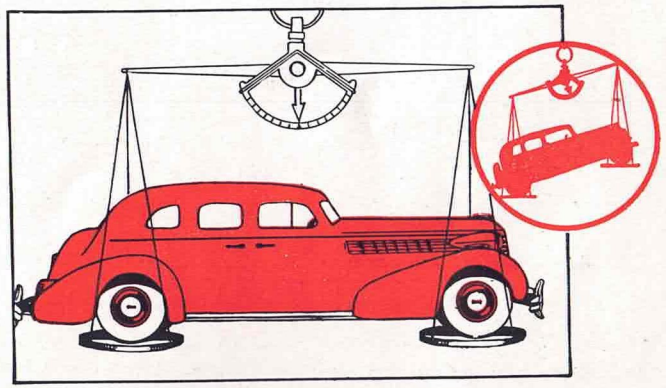

**Buick rear springs are "free acting" at front and rear, made possible by torque tube drive, which pushes the car**

spring, the riding qualities, due to the springs, remain constant throughout the life of the car. Spring and shackle lubrication is a thing of the past, eliminating eight lubricating points.

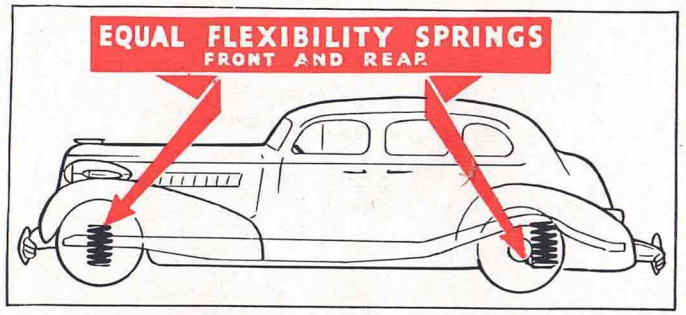
The maximum advantages of this construction can only be obtained with the torque tube drive as used by Buick.

## SCIENTIFIC WEIGHT DISTRIBUTION

Buick's weight has been evenly distributed over the front and rear springs, thus the car is in perfect balance. (See illustration.) This equal distribution of weight together with the combination



**Buick's weight is equally distributed front and rear**

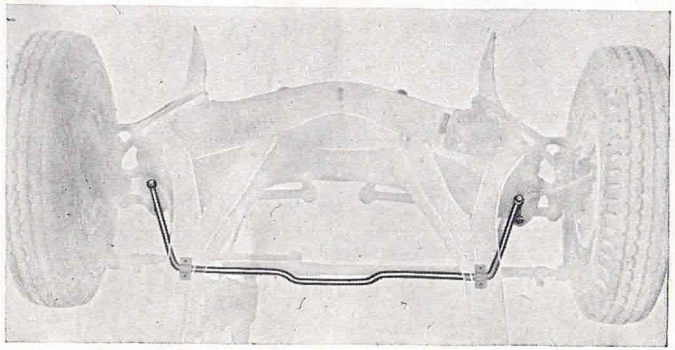



Equal flexibility of springs, front and rear

of knee-action and torque-free springing makes possible front and rear springs of equal flexibility. As a result, the spring action is uniform over all types of roads.

## BETTER ROADABILITY

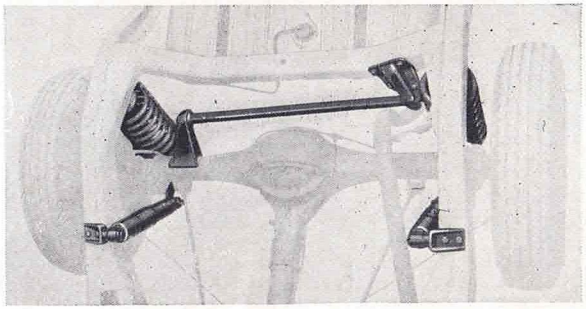
To eliminate sidesway and body roll when going around curves, your Buick is equipped with a ride stabilizer at the front and a radius rod at the rear. (See illustration.)



Front Ride Stabilizer

The front ride stabilizer is connected across the front of the car to the spring seats through rubber cushioned rings; as the car tends to sway, this action is resisted by the strength of the spring steel bar.



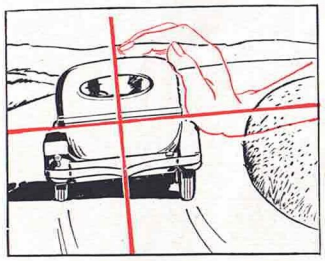


Rear Radius Rod

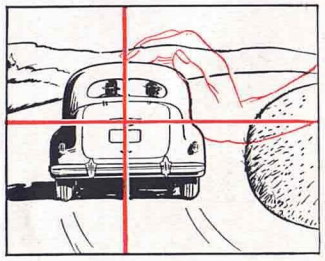
Sidesway is eliminated by means of this radius rod which is mounted on rubber bushings.

**Neither the front ride stabilizer nor the radius rod require any lubrication or adjustment.**

These two items are very important because while it is desirable to have springs which will fully absorb road shocks, the extreme flexibility of such springs means that the car has a greater tendency to sway on curves unless the flexibility is controlled.



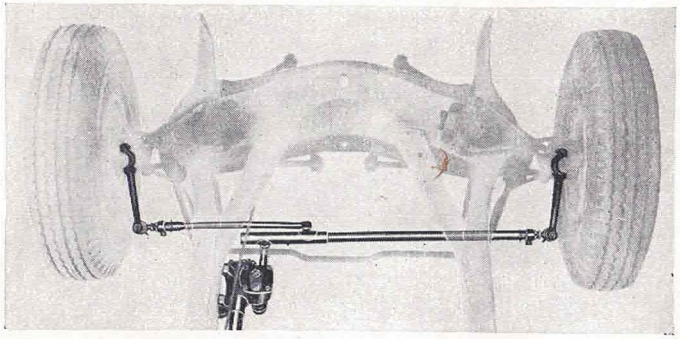
Conventional Car—Lack of ride stabilizers causes sway



New Buick—Ride stabilizers front and rear eliminate sway

## STEERING

Both Center-Point Steering as used on Series 80-90, and Bull's Eye Steering on Series 40-60, result in unusual ease of handling and shockless steering control. **Lubricate every 1000 miles.**



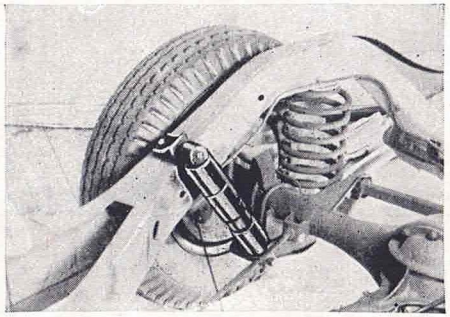
Center Point Controlled "Shockless" Steering—Series 40-60 Construction

Worm and double roller straddle type of steering gear is used on all models which greatly facilitates ease of handling.

**Check oil level twice a year.**

## THE BUICK SHOCK ABSORBERS

Buick provides double-acting shock absorbers, both front and rear, on all series. They check the wheels on both compression and rebound of the spring over all types of roads and thus contribute toward smoothing out the ride.



The Buick Shock Absorber

The direct-acting type of shock absorber as used by Buick on the rear wheels are the largest shock absorbers of this type used by any passenger car manufacturer. This size shock absorber permits finer, more accurate calibration for every driving condition.

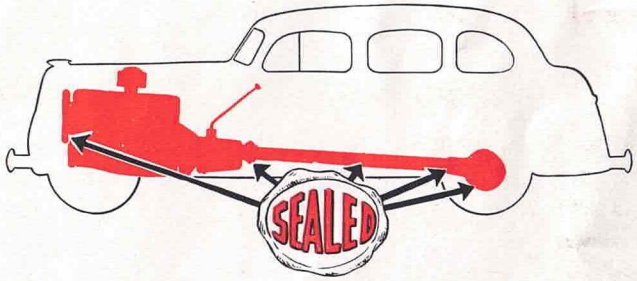


Both ends of the shock absorbers are mounted on firm but fully insulated rubber bushings which assist in preventing noises from being transmitted to the body.

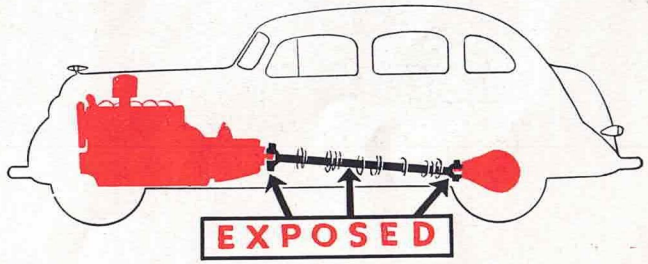
**The shock absorbers should be checked twice a year to make sure they operate properly.** It is suggested that you have this taken care of by your Buick dealer as a **particular grade of fluid in the correct amount must be used for correct shock absorber action.** It is necessary to maintain the full efficiency of those units for complete riding comfort.

## SEALED CHASSIS

Buick's famous sealed chassis made possible through torque tube construction is an important long life and dependability feature and one that is easily understood.




Buick chassis is sealed from the fan to rear wheels from dust, dirt and water

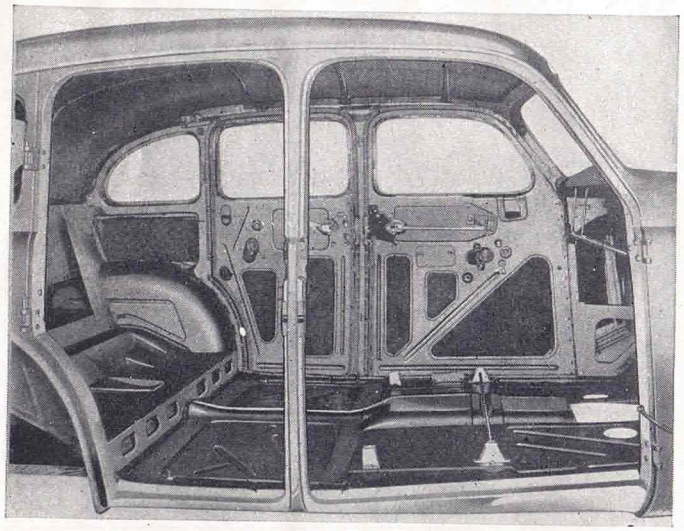



Conventional car with propeller shaft and universal joints exposed

With this construction, the torque tube provides the final link in sealing the chassis from fan to rear wheels. This protects fine working parts from dust, dirt and water and prevents the escape of lubricants.

But in the last analysis, the life of your car is largely dependent upon the care you give it.

**On page 9 you will find detailed instruction regarding the periodic service recommended.**

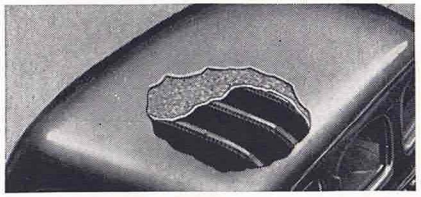


**Sectional view of Buick solid steel body**



# THE BUICK BODY

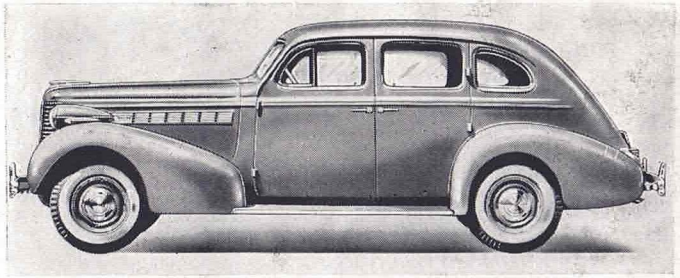
The rugged construction of the solid steel Turret Top Body by



**Sectional view of Buick Turret Top**

Fisher gives you the protection of solid steel on all sides — there is no "soft spot" over your head.

With strong U-shaped steel cross bows arched across its crown, steel on its sides and steel on the bottom, the body on your Buick has a sphere-like rigidity.



**Buick 47 Sedan**

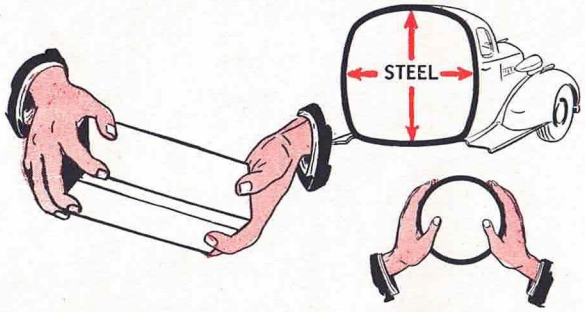
In addition, it is heavily insulated against heat, cold, vibration and external noise. You ride in quiet comfort and perfect peace of mind — regardless of the speed at which you are traveling or the temperature and noise outside.

Refreshing, draft-free ventilation is assured with Fisher No Draft Ventilation, as described on page 70.

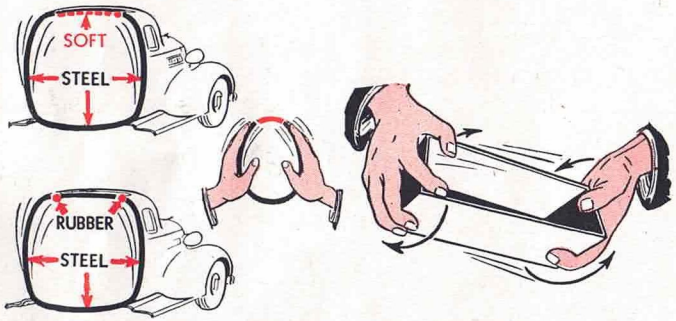
On the inner side of the door flange there is a rubber seal which excludes water, dust, air, and external noises, similar to the seal used on refrigerator doors.

When the doors are closed, this rubber seal is tightly compressed against the outer door recess. This makes the absolute tightness and rattle-free solidity of the body doubly certain.

You have probably noticed the unusually solid sound you hear




**Buick bodies have steel on top, steel on the sides, and steel below. The rounded corners give it a sphere-like shape for greater strength . . . A box, with a cover securely attached, gives greater strength as the top ties the four sides together.**



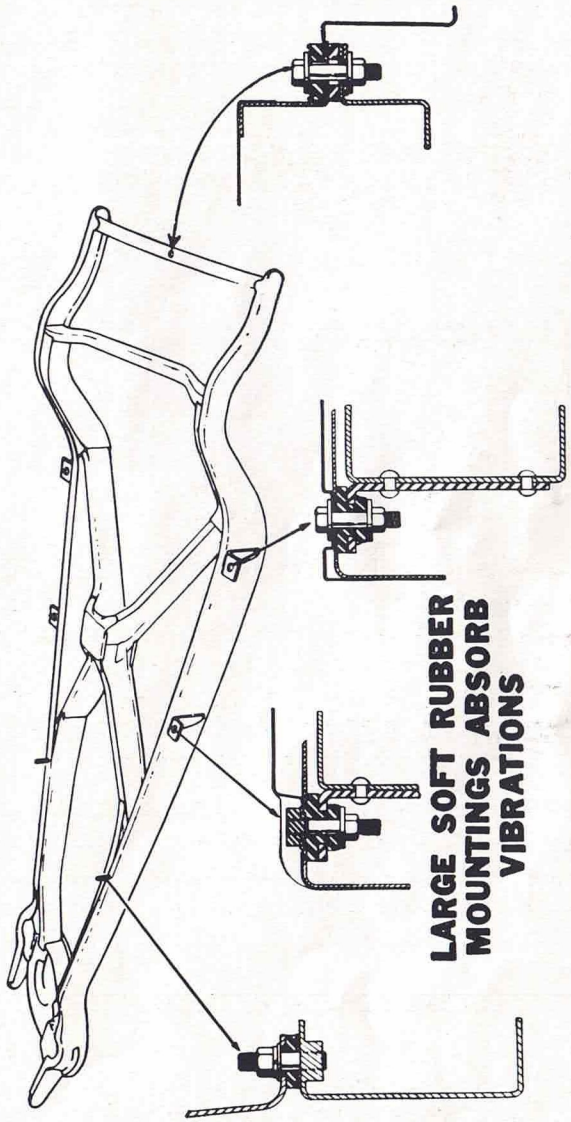

**Without a solid steel top the strength of the sphere is lost even though there may be a steel floor with a "patched" or "soft" roof . . . Notice also, that a box without a top is sensitive to twist as the sides lack the reinforcement a solid top would give.**

when you slam any of the doors of your Buick shut. There is no tinniness. This substantial solidity that even your ears detect is your assurance that the body on your Buick is not only completely safe — but that it will continue to remain as solid, true and comfortable as it is right now.

## SILENT-ZONE BODY MOUNTINGS

Your 1938 Buick employs an entirely new method of fastening the body to the frame, known as Silent-Zone Mounting. By reference to the illustrations you will note that there is no metallic connection whatsoever between the frame and the body. In order to eliminate any side rail vibration with its resultant rumble, the rear body mountings are soft rubber pads and a clearance is provided at this point between the body and the frame side rails. This type of body mounting has practically eliminated the fundamental cause of all rattles and squeaks.

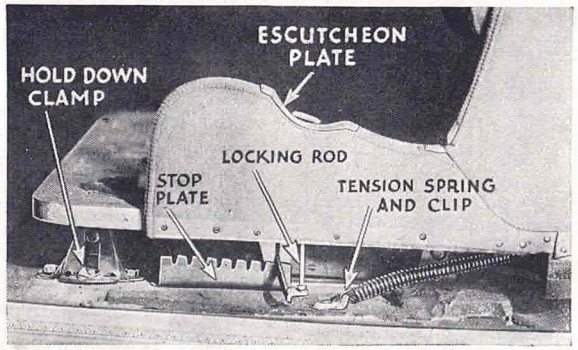





**Silent Zone Mounting eliminates "rumble" or "drumming"—prevents body distortion and consequent squeaks**

## THE ADJUSTABLE FRONT SEAT

You can move the front seat of your Buick as your own height requires for driving comfort. This is accomplished by giving a slight lift or pull to the release handle under the seat on the driver's




Mechanism for adjusting seat to desired position

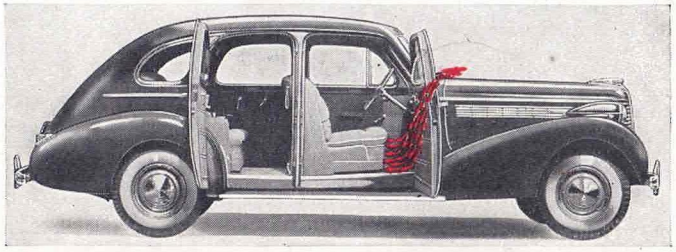
side and moving the seat with you as you move your body. As the seat is moved **ahead** it also lifts up, tilting the back into a more upright position. This brings the front edge of the cushion a little lower so that the person who needs to be close to the foot controls is lifted up to obtain better visibility.

## FISHER NO DRAFT VENTILATION

Like knee-action wheels, Fisher No Draft Ventilation is another feature which makes riding in a Buick a real pleasure regardless of the conditions under which you travel.

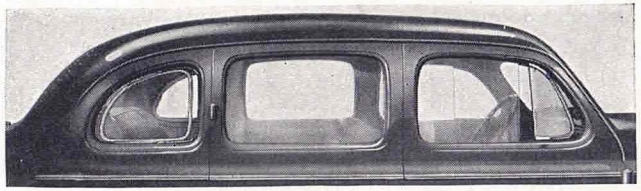
It enables you to keep the interior of your car supplied with refreshing air without subjecting the passengers to drafts.

By setting the Ventipanes at the proper angle, you can control the circulation of air to suit your comfort and that of each indi-

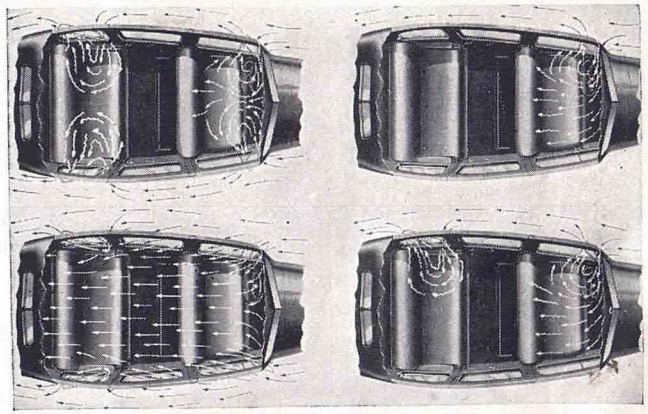


Cowl Ventilator





Fisher No Draft Ventilation



Upper left . . . Arrows indicate travel of air with all ventilators open.
Lower left . . . Arrows indicate travel of air with all ventilators set in "scoop" position.

Upper right . . . Arrows indicate travel of air with left front ventilator open.
Lower right . . . Arrows indicate travel of air with left front and left rear ventilators open.

vidual passenger — on stuffy, hot days or blustery, cool ones, in wet weather as well as dry.

The diagrams above demonstrate the most efficient Ventipane settings under various weather conditions.

With the Ventipane open sufficiently as shown, fresh air is drawn in over the forward surface while the vacuum on the back surface sucks out the stale air. Thus, draft-free circulation is obtained.

**All Ventipanes Open.** The arrows show the complete individual control of ventilation that Fisher No Draft Ventilation provides. Each passenger gets his own supply of air. Therefore, even a single passenger in a full car can have all the air he desires without interfering with the comfort of the other passengers.

**Driver's Window and Ventipane Open.** Note how the air flows across the windshield and circulates around the front seat. The flow across the windshield prevents clouding in cold or rainy weather.

**In Hot Weather** simply open all Ventipanes as wide as possible and pull the windows down. In addition to the air that flows in through the open windows, the Ventipanes "scoop" in greater quantities and distribute it throughout the car.

**In Cold Weather** with a heater on in front, the warm air from the heater is actually drawn into the back of the car when the rear Ventipanes are opened as shown.

**On Rainy Days** open the Ventipane so that it does not extend beyond the outside edge of the drip-shield as shown. The drip-shield keeps out the rain and yet you still get a circulation of air.

In addition to the Ventipanes, your Buick is also equipped with a cowl ventilator (see page 70). The cowl ventilator, when opened, scoops in additional cool air and circulates it around your feet. You probably will want to use this only on exceptionally hot days. This cowl ventilator is particularly useful in the two-door sedans which do not have rear window ventilators.

## CARE OF FINISH

You have read in other sections of this manual the importance of proper lubrication and care of the mechanism of your Buick. It is equally important that you give its finish a share of your attention, too, for the following reasons:

1. To prolong its beauty.
2. To protect the value of your investment.
3. To increase your satisfaction and pride of ownership.

Accordingly, here are a few simple suggestions for preserving the finish.

Here is an artist's sketch of what a cross section of the finish on your car looks like when it is new. At the bottom is the steel sheet that must be preserved.

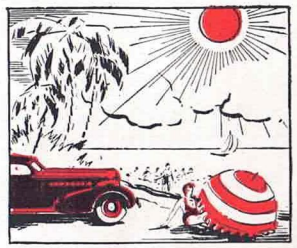
Next comes the specially prepared undercoat, and finally the lacquer finish. The dots represent the particles of pigment that give the finish its color, held together by a carrier or binder. So long as the binder covers the pigment particles, the color and gloss will be retained.



## THE WEATHERING EFFECT

Sunlight, rain, snow, and road dirt—all war against the finish of your car, and with relatively slight effect. However, **over a period of time some change, known as "weathering," can be noted.**

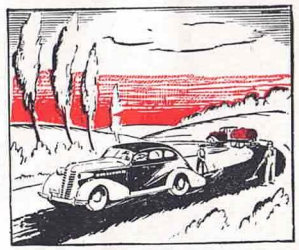
**The finish is dulled principally by the action of sunlight and water.** It is obvious that prolonged exposure to the elements is not helpful.


Sunlight and Moisture

**If the car is used along the seashore for a period of time,** special precautions should be taken to protect the finish and chromium. **It is advisable to wax the body and plated parts every three or four months as this wax coating prevents rust and corrosion.**

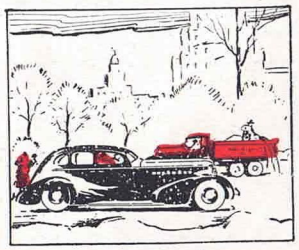
Salt Air

**When operating the car over dusty roads,** a few minutes now and then should be spent to **remove the accumulated dust with a soft cloth, wiping rather than rubbing the surface in order to avoid scratching the finish.** This lessens the necessity for more frequent washing of the car.

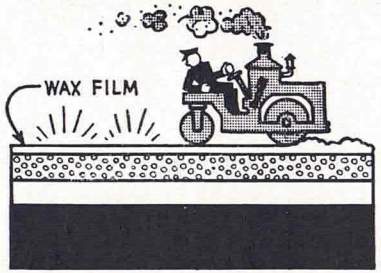

Tarred Roads

**If the car has been operated over roads that are freshly tarred, the tarred spots can be removed from the body with a commercial tar remover. If the tar is still fresh, it can be removed with white gasoline, or better yet, kerosene or fuel oil.**

**Winter driving in northern sections of this country, particularly in cities where salt or calcium chloride is used to melt ice on the streets,** requires special precautions on owner's part to preserve the chromium and finish. **Frequent washing to remove the salt**


Winter Roads

or calcium chloride deposits will decrease their harmful effects.




### THE PROTECTED FINISH

Here the spent pigment has been removed and the body waxed, leaving a thin film of wax as a protective coating over the lacquer surface. The finish has been restored and further erosion checked.

Since the wax film does not last indefinitely, it must be renewed from time to time.

## CARE OF MODERN MOHAIR VELVET AUTO UPHOLSTERY

This upholstery can be washed safely with soap and water. Use lukewarm water and a neutral soap. The suds should be good and frothy, not "watery," and should be applied in moderate quantities with a damp cloth, sponge or soft brush. Be sure to rub **with** the pile, not against it. Remove suds with a clean damp cloth or sponge. Then wipe surface several times with a dry cloth. Brush material lightly, while still damp, with a whisk-broom or brush of medium stiffness. Permit air to circulate freely over the wet upholstery and, when dry, brush again **with** the pile.

## CARE OF BROADCLOTH AND BEDFORD CORD UPHOLSTERY

These fabrics can be completely cleaned, but not with soap and water. Because these are "flat fabrics," spots — if they are not immediately removed — may spread and be absorbed, making removal difficult. Care should be taken in the use of cleaning solvents to minimize the amount of "finish" removed from the material and lessen the possibility of "cleaning rings."

### INSTRUCTIONS FOR REMOVING STAINS

1. **Use clean cloths and be sure clean portions of the cloth are used throughout any operation.**
2. **A neutral (non-alkaline) soap should be used whenever soap suds are applied.**



3. **Avoid using hot water, except when instructions call for it, and then it should be wiped off immediately before it has a chance to run.**
4. **Do not use any gasoline as cleaning solvent, which is colored or contains tetraethyl lead.**
5. **Do not use bleaches or reducing agents. Follow specific instructions carefully.**
6. **Most cleaning solvents, except carbon tetrachloride solutions and chloroform, are inflammable and care should be taken in handling them. Chloroform should be used carefully and in small quantities so that vapors are not inhaled.**
7. **Mohair velvets should always be brushed in the direction of the pile or lengthwise of the goods.**
8. **In removing grease spots, start just outside the spot and rub towards it. This will lessen the possibility of cleaning rings.**

While instructions for removal of specific types of stains are included in the "Hand Book on Care of Upholstery" (see your copy in the glove compartment), your Authorized Buick Dealer will gladly render any assistance required.

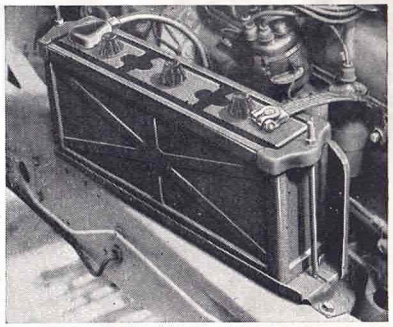
# FOR THE MECHANICALLY MINDED

You will frequently hear modern car owners say, "I don't know anything about machinery. I don't even like to lift the hood."

It is entirely possible and sensible for people to drive a Buick in this way. The car is built, and Authorized Service is maintained to give owners all the pleasure of driving without the "chore" of bothering with mechanical adjustments or even slight repairs.

But, there are other drivers who actually like to work on their cars. Such people have some knowledge of mechanics, and we can see no reason why they should not have the pleasure which this experience provides.

If you are such an owner, the following pages will interest you. Needless to say, there are many jobs which require not only experience, but proper tools and equipment as well. **If there is any question, the safe rule is to take your car to an Authorized Buick Service Station.**

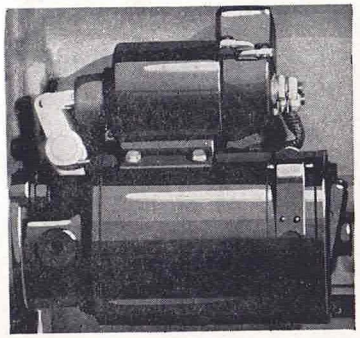


New Battery Location

## THE BATTERY

All series are equipped with a 17-plate, 110 ampere hour Delco battery, No. 17E1-W. Instructions for servicing the battery will be found on page 52.

**Terminals A and B must always be tight to secure maximum efficiency from the battery.**

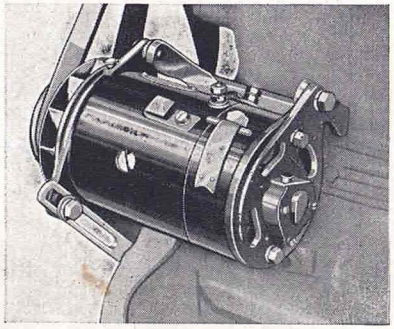


Buick Starter

## THE STARTING MOTOR

**Starting motor front bearing should be lubricated each 1000 miles with a few drops of engine oil. Also a few drops**

should be used on the fulcrum of the shifting mechanism lever. Do not oil the solenoid plunger.

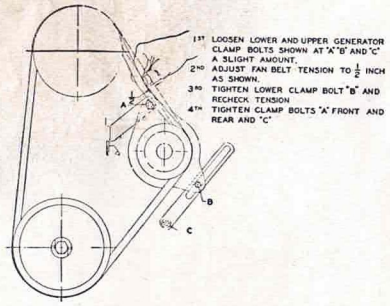


New Generator Mounting

## THE GENERATOR

The generator charging rate is not adjustable. Generator can be assumed to be functioning properly when the instrument panel indicator shows "charge" at road speeds between 10 and 15 miles per hour, providing the only current used is for the ignition system.

Lubricate the generator at the front and rear bearing as shown in illustration. Use engine oil every 1000 miles.




Fan Belt Adjustment

## FAN BELT

This belt also drives the water pump and generator. It should always be in good condition and kept in proper adjustment, as illustrated.

CAUTION: Do not operate car without a fan belt as coolant will surely be lost due to heating and this may cause damage to the engine.

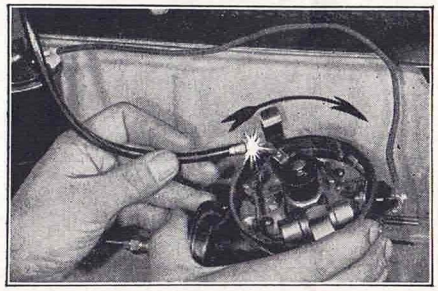


Fig. 1. Checking Timing

## ENGINE TIMING

1. Check breaker point gap as follows:
   (a) Remove distributor cap and rotor. (See Fig. 1.)
   (b) Rock engine over slowly until breaker arm points are open to the widest position.



   (c) Check gap with .015" feeler gauge.
   (d) If gap is incorrect, loosen lock screw and turn eccentric screw until gap is just .015".
   (e) Tighten lock screw securely after adjusting the gap.
2. Uncover timing hole on side of flywheel housing. (See Fig. 2.)
3. With the ignition "off" turn engine over until distributor rotor is approximately under No. 1 high tension terminal. If distributor has been removed turn engine over until No. 3 cylinder exhaust valve "D," Fig. 3, starts to open. Continue to turn slowly until the "Adv." mark on flywheel comes directly opposite the index line on flywheel housing. This is the position to fire No. 1 cylinder.

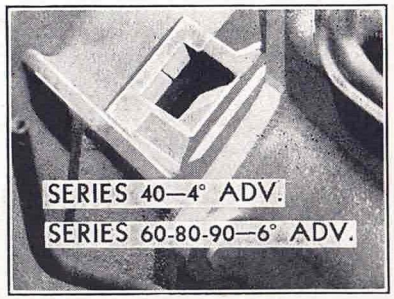



Fig. 2. Timing Mark

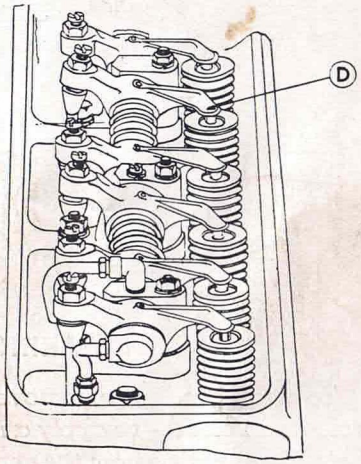
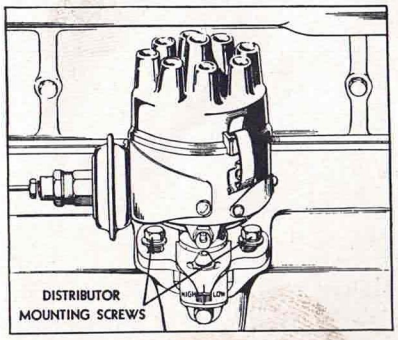



Fig. 3. No. 3 Exhaust Valve

## THE OCTANE SELECTOR

To adjust the octane selector, it is necessary to loosen the two distributor mounting screws. The distributor can then be rotated so that the pointer is toward the low side of the scale for fuel of low octane rating, and toward the high side for fuel of high octane rating.



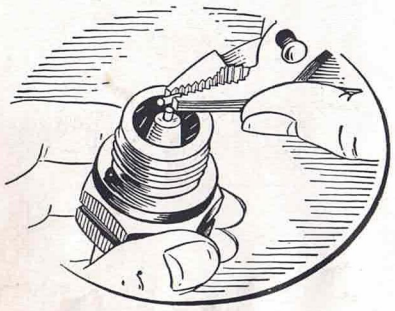

Pointer position—Regular gasoline

The correct position for low octane fuel is indicated if there is a very light "ping" between 10 and 20 M.P.H., when accel-

erating with the throttle wide open. To obtain maximum economy, do not move the control lever toward "low" more than necessary. All cars should have a slight "ping," even with high octane (Ethyl) gas for best performance.

## THE SPARK PLUGS

In case you readjust the spark plug gap, always make the adjustment from the grounded electrode (see illustration) and never from the center electrode, as this may crack or break the porcelain.



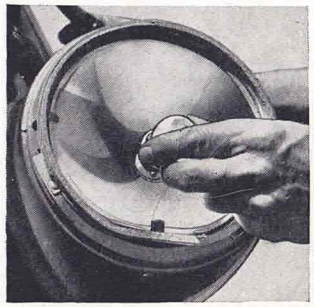
Spark Plug Adjustment

AC type 46, 14 mm spark plugs are used in all models. The gaps of the plugs should be set at .023" to .028". The higher limit contributes to a smoother idle.

## CLEANING HEADLIGHTS

To clean headlights, remove the headlight lens and wipe with a soft, clean cloth — or apply a mixture of lampblack and pure alcohol. Always wipe from the center straight out to the rim. Rubbing

Loosening Rim

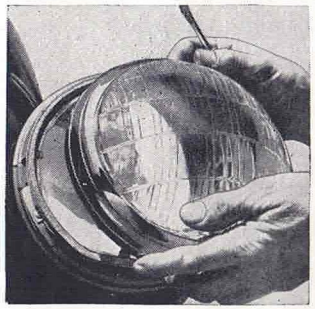


Removing Light Bulb

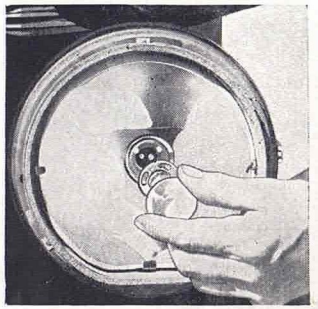
in a circular motion may cause slight scratches in the reflector and lessen its efficiency. If frequent cleaning is required, inspect rim gaskets to see if they need replacing.



Bulbs that have turned dark should be replaced. The Buick Pre-Focused Bulb can be installed in only one position. Its base is marked "TOP." When installing bulbs, make sure that all three



Removing Rim and Lens



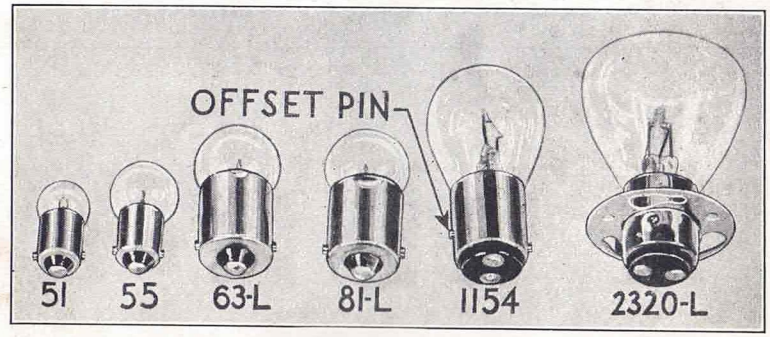
Installing Light Bulb

hold-down lugs enter the slots in the bulb base. Then turn the bulb to the right so that the hold-down lugs are in the extreme end of the slots.

If a headlight lens becomes broken, the reflector should be protected by fastening a cloth over the headlight face, until a new lens can be secured.

**It is important to use only genuine Multi-beam lens and the right or left lens as required.**

To obtain maximum results in road illumination and the safety which has been built into headlighting equipment, headlamps must be properly aimed. **Headlamp adjustment should be checked at frequent intervals and particularly following replacement of burned-out bulbs.**



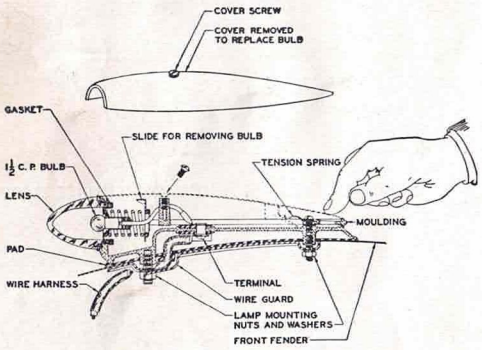

Lamp Bulb Numbers

## LAMP BULBS

| Bulb No. | Candle Power | Approx. Current Amperes | Qty. Used | LOCATION |
|---|---|---|---|---|
| 51 | 1 | .25 | 3 | 1 beam indicator, 1 glove compartment light (part of clock) |
| 55 | 1.5 | 5 | 8 | 2 instrument panel lights, 1 clock, 1 radio (accessory), 1 trunk compartment lamp (accessory), 1 map light, 2 fender lights |
| 63-L | 3 | .75 | 1 | 1 license plate lamp |
| 81-L | 6 | 1.25 | 1 | 1 dome light |
| 1154 | 21-3 | 2.6-.57 | 2 | 2 stop and tail lights |
| 2320-L | 32-21 | 5.00-3.50 | 2 | 2 headlights |

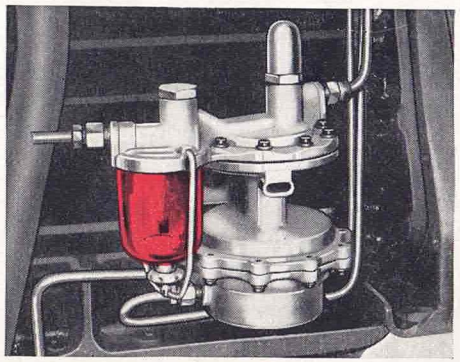
## REMOVAL OF FENDER LAMP GLASS AND BULB

Bulb can be replaced by removal of the cover (upper half) of lamp body. This is accomplished by removing the screw and pressing at the back of the cover. See illustration. After the cover has been removed, the bulb can be taken out by pulling up on the slide which supports the coil tension spring. The front glass can then be replaced by removal of the chrome plated molding.




Front Fender Lamp—All Series

## THE FUEL SYSTEM



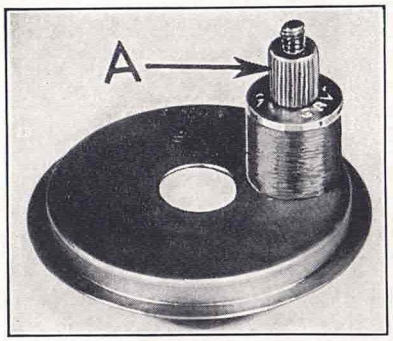
Fuel and Vacuum Pump—Series 60-80-90

### CLEANING FUEL PUMP BOWL AND FILTER

The fuel filter is incorporated in the fuel pump. It comprises a glass sediment bowl with a special washer type strainer through which the fuel must pass. Dirt and water settle in the bowl which is removable.

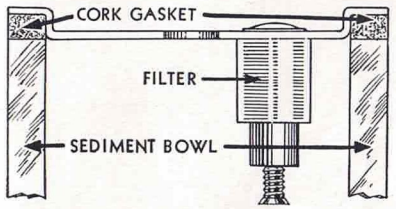


The strainer can be removed for cleaning by first removing the bowl. Clean the strainer as follows:




Fuel Pump Filter

1. Wipe off all dirt on outside of unit. Loosen nut "A" and gently blow through the strainer with a stream of air.
2. If the strainer is gummy, wash in benzol, alcohol or methanol to remove gum, and then blow through it with a stream of air.
3. Tighten nut finger tight and replace unit in pump, making certain that cork gasket is properly seated.
4. Cork gasket should be turned over after first removal of bowl to prevent leaking. A new gasket should be used when both sides of gasket show cork is compressed from strainer contact.




Proper Assembly of Bowl and Filter

It is important that strainer and bowl be inspected and cleaned frequently, thus reducing to a minimum the possibility of dirt being forced into fuel pump valves, carburetor jets and float needle seat. Dirt at float needle will cause flooding.

**CAUTION: Be certain parts are assembled as shown in above illustration, otherwise no filtering will occur.**

## HOT STARTING CAR WITH HIGHLY VOLATILE FUELS

In some parts of the country gasolines are marketed for easy starting. Some of these fuels are far more volatile than regular gasoline, and boil easily in carburetor bowls only normally warm. Such gasolines, however, are not needed in your Buick, since its automatic choke and heat control have been designed to provide easy and positive starting on regular blends of gasoline.

These volatile gasolines make it very easy to "overload" the manifolds during starting trials when manifold is hot.

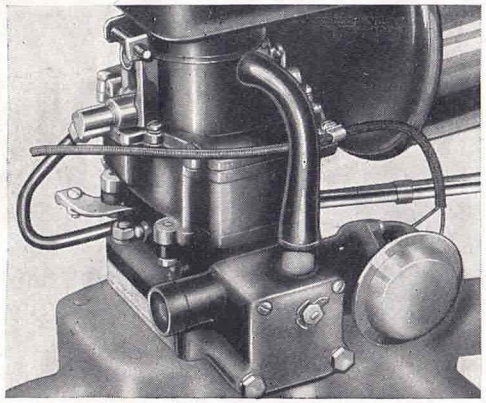
If starting trouble is experienced, due to this condition, the following procedure will help overcome any starting difficulty:

After turning on ignition switch, **depress accelerator pedal all the way to floor instead of just enough to engage starter. Hold the pedal down in this position until the engine starts and runs sufficient to allow throttling at a reasonably low speed without stalling.**

No damage to the starter mechanism will result from this method of starting as the starter will automatically be released as soon as engine speed increases sufficiently.

## CHOKE VOLATILITY SELECTOR

The choke is adjustable for initial setting to care for fuels of "low" and "high" volatility when starting a cold engine.



Automatic Choke

This adjustment has five positions which are maintained by a spring detent on the pointer which registers with recesses in a plate.

The illustration shows the choke and the adjustable pointer as viewed from the right side of the car.

To "lean" the starting mixture, as for volatile fuels, turn the pointer (using pliers on the hexagon-headed nut) counter-clockwise, or to "richen," as for lower volatility fuels, turn clockwise.

## THE BUICK CARBURETOR

Your Buick car is equipped with either a Stromberg or Marvel carburetor.

Before adjusting the idle speed, the engine should be thoroughly



warmed up and the throttle stop screw adjusted until the **engine idles at a speed equivalent to seven or eight miles an hour on a level road,** for cars equipped with synchro-mesh transmissions.

There are two idle adjusting screws, one for each barrel of the carburetor. Each barrel should be adjusted separately and three operations are necessary for each adjustment.

1. Turn the adjusting screw out slowly until the engine rolls from richness.
2. Turn the adjusting screw in slowly until the engine lags or runs irregularly from leanness.
3. From the lean setting turn the screw out slowly to the richest mixture that will not cause the engine to "roll" or run unevenly.

Either barrel may be adjusted first and when one has been adjusted the above procedure should be repeated on the other.

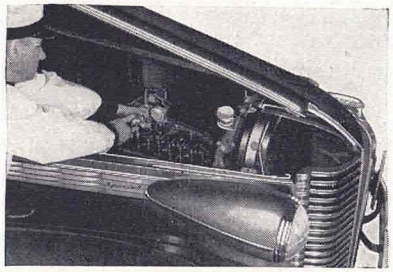
This adjustment will in most cases give a slower idle speed than a slightly leaner adjustment with the same throttle stop screw setting, but will give the smoothest road operation. The desired idle speed can be obtained by readjusting the throttle stop screw.

The adjusting screws or needles are made of brass and it is important to not screw them tightly against the seats as this might cut grooves into the needles, making it difficult to obtain a satisfactory adjustment.

An adjustment is provided for the length of stroke of the accelerating pump in the carburetor. This adjustment is made by moving the pump connecting link into a different hole. There are two holes provided on the Stromberg and four holes on the Marvel carburetors. When the car was built the stroke was set for ordinary fuels and for moderate air temperatures, and should not be changed except when highly volatile fuels are to be used regularly, or when the car is to be driven regularly in extreme air temperatures. In case this adjustment is desired, it should be made at an Authorized Buick Service Station.

## THE BUICK VALVES

The correct lash is .015" with the engine at normal operating



Buick's accessible valve adjustment

temperature. It requires 8 to 10 miles of running to bring the entire engine to its normal operating temperature. The adjustment is made at the ball stud of the rocker arm and the lash determined by "feeling" clearance between the valve and the rocker arm using an .015" feeler gauge. This adjustment can best be made with the engine idling.

## BUICK AIR CLEANERS

Figures 1 and 2 show the regular production air cleaner which is used in areas free from large quantities of dust.

Figure 3 shows the Heavy Duty Oil-Bath Air Cleaner necessary for use in dusty areas.

**The screen element in the regular air cleaner should be cleaned and reoiled every 2000 miles.**

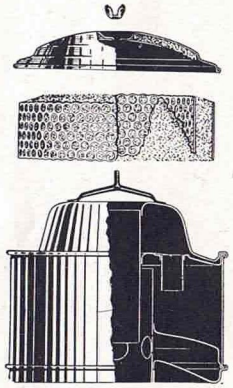


Fig. 1. Air Cleaner (Regular) Series 40

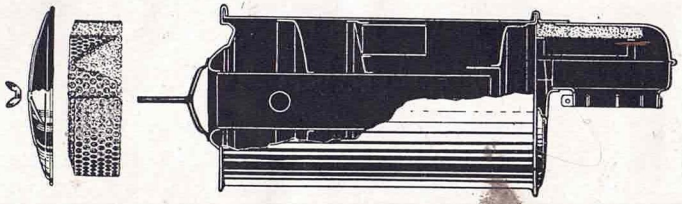


Fig. 2. Air Cleaner, Regular—Series 60-80-90

To clean—remove the wing nut in Figures 1 and 2 and pull off the cleaning element. This will permit the filtering element to be removed. Clean this part in a pail of white gasoline. Rinse until thoroughly clean and reoil the screen element with No. 50 cylinder oil until

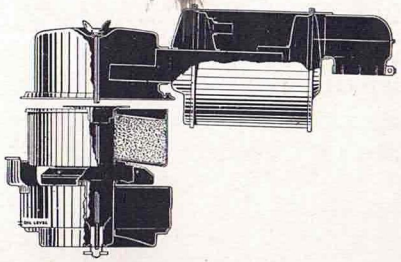


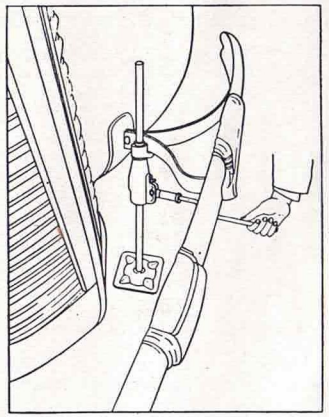
Fig. 3. Air Cleaner, Heavy Duty—All Series



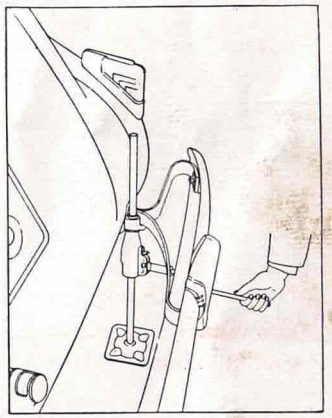
thoroughly covered with a film of clean oil. When the engine is first started, after oiling the air cleaner, the exhaust may be clouded with blue smoke. This will be only a temporary condition and will correct itself in a minute of running.

The Heavy Duty air cleaner can be easily distinguished from the regular cleaner by its appearance. To clean the filter element, remove wing nut which will allow the filter element to be pulled off. Clean in gasoline as described previously.

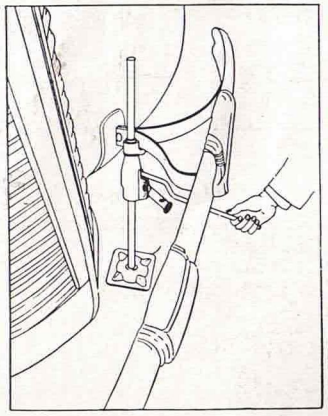
This cleaner carries one pint of No. 50 cylinder oil in the pan and **the oil should be replaced with clean oil every 10,000 miles.** NOTE: Gasolines containing Ethyl are poisonous and should not be used for washing parts.



Raising Front



Raising Rear



Lowering

## USE OF JACK

Maximum height of jack is controlled by a rim on top of the shaft and the jack cannot be raised so high as to come apart or cause failure.

When maximum height is reached, shaft telescopes into the housing approximately halfway, which permits three inches more lift on Series 40-60, and four inches on the Series 80-90.

## CHANGING TIRES

To remove wheels proceed as follows:

1. Jack up the car under bumper, as shown in illustration above.

2. Pry off cap with screwdriver.
3. Remove the nuts with the demountable wheel wrench.
4. The wheel can then be removed from the hub.

Illustrations on page 87 show location of jack when lifting wheel.

## REMOVING TOP BEAD WITH WHEEL ON FLOOR

Deflate tube completely. Loosen both beads from rim ledges, using tool if necessary. Stand on tire with feet about 15 inches apart opposite valve stem to force bead off the bead seat into the well. See Fig. 1. Insert two tire tools about 8 inches apart between bead and rim flange near valve stem and pry short lengths of bead over flange, as shown in illustration. Then, leaving one tool in position, follow around rim with the other tool, taking small bites, to remove remainder of bead.

Fig. 1

Fig. 2

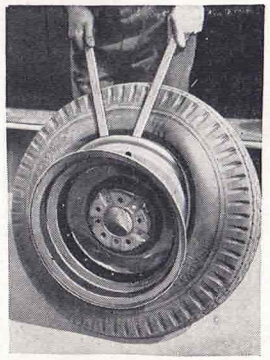


Fig. 3

## REMOVING BOTTOM BEAD

Remove inner tube. Fig. 2. Stand wheel in upright position with bead in well of rim at bottom, and apply soap around both sides of the rim. Insert tool between bead and rim flange at top side of wheel and pry wheel out of tire, as shown in illustration. See Fig. 3.

## APPLYING BOTTOM BEAD

Before mounting, use soap, as tire changing is made extremely easy by coating the inside and outside tire beads with soap, which



helps the beads to slide back completely against the rim flange. The use of soap is highly recommended. **Do not use oil or grease.** Inflate tube until barely rounded out and insert in tire. Place tire on rim, guiding valve through valve hole. Push bottom bead down into well at valve stem and force remaining portion of bead over rim flange, using a tire tool if necessary (see illustration). When following around, use small bites.

At point opposite valve stem, insert tool between top bead and rim flange, prying bead over rim flange and into the well. Holding this tool in position, continue prying with other tool, taking small bites, working around rim until bead is in place (see illustration). Always keep as much of the top bead as possible in the well while applying. Push valve stem back into casing to make certain that tube is not pinched under the bead. Do not let go of the valve stem while doing this. Inflate slowly and see that tire beads are centered on rim at both sides, before inflating fully.

When replacing wheel make certain that the nuts are drawn up tight. In tightening the nuts, continue to tighten until the wheel is drawn up snug against the hub flange.

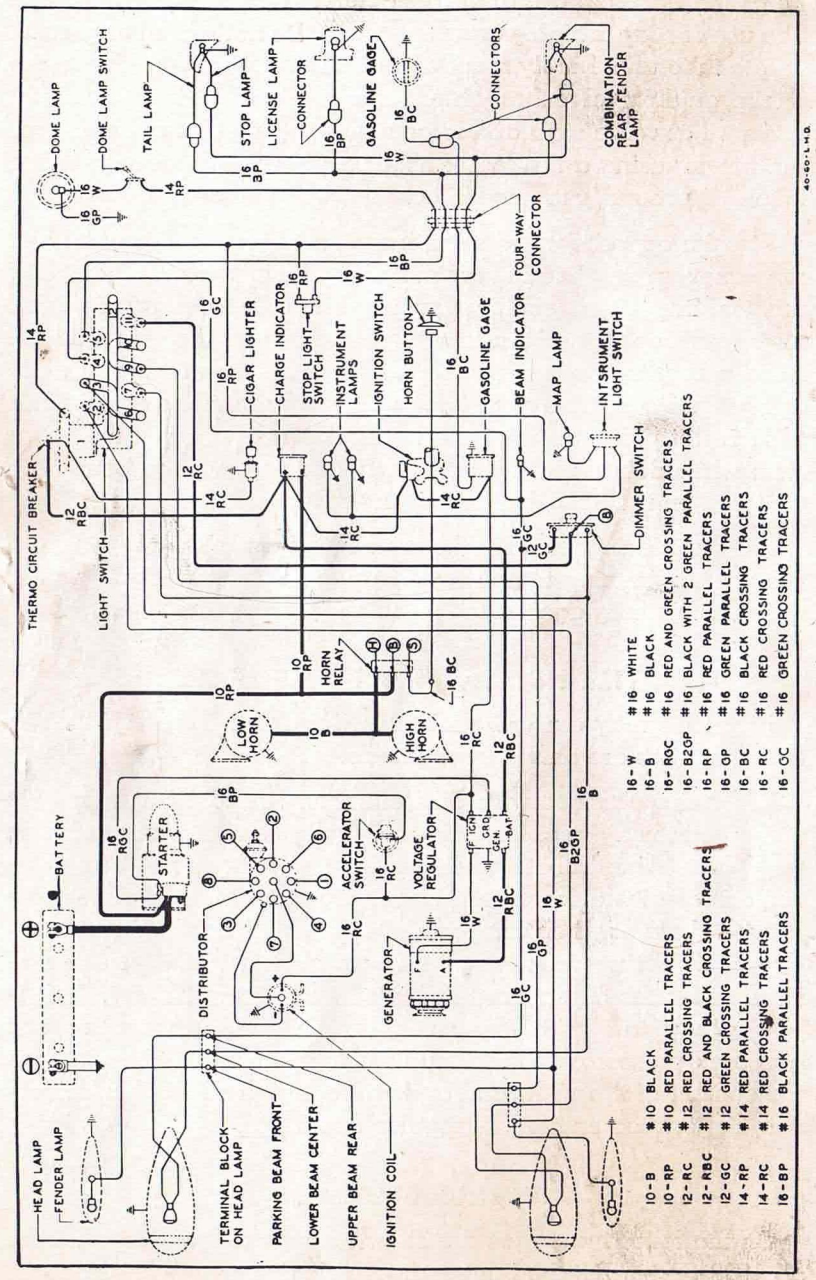
## TIRE NOISE vs. REAR AXLE NOISE

Tire noise may easily be mistaken for axle noise even though the noisy tires are on the front wheels.

Tire noise changes with different road surfaces but rear axle noise does not. Rear axle noise usually ceases when coasting with gears in neutral at speeds under 30 miles per hour. Tire noise continues but with lower tone as car speed is reduced. Axle noise always changes when comparing **"pull"** and **"coast."** Tires which have the surfaces of the non-skid divisions worn with one end higher than the other (saw tooth wear) are usually noisy. This is particularly true with low tire pressure. For comparative test purposes, pressures up to sixty pounds may be used. This changes the contact of tire with road and will diminish noise. For correction, see section entitled, "Irregular Tire Wear."

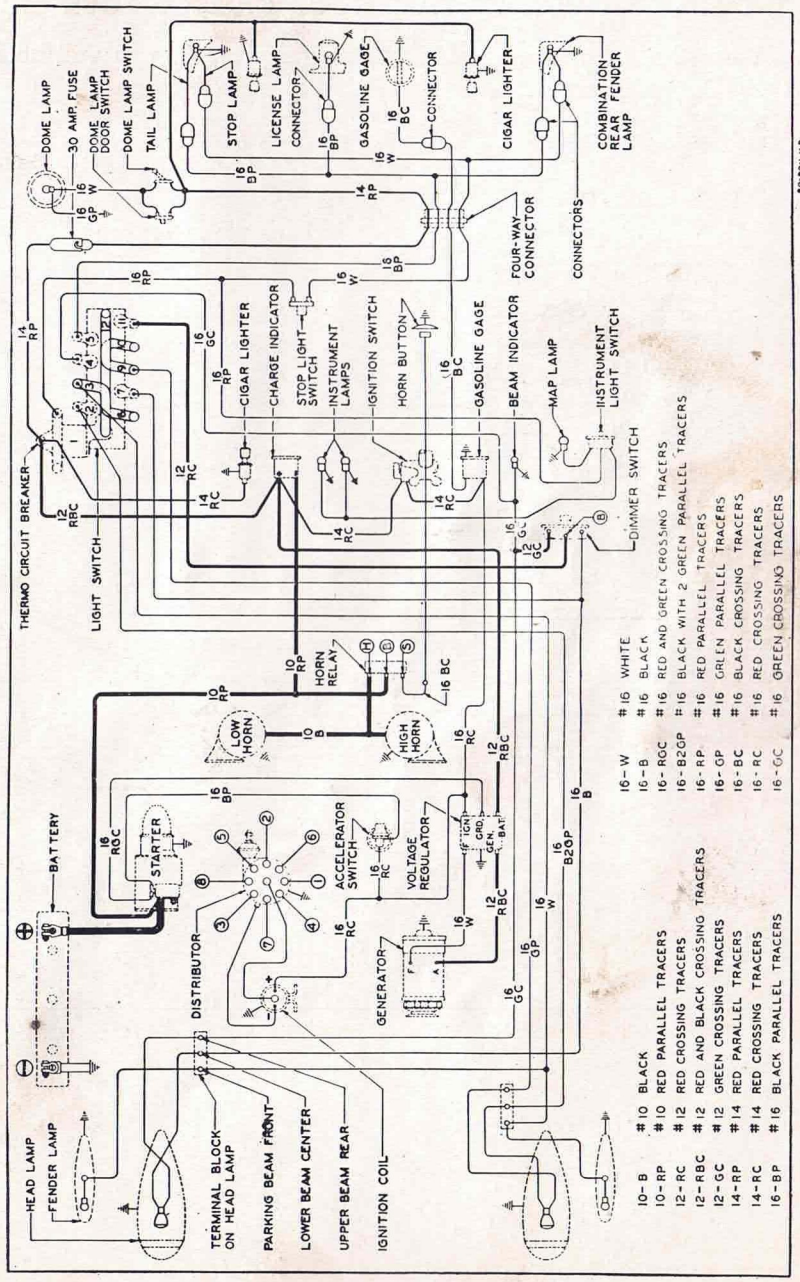
## WIRING DIAGRAMS

On the following pages are shown wiring circuit diagrams for all 1938 Series Buicks. These diagrams will be of assistance in tracing electrical circuits.




WIRING CIRCUIT DIAGRAM—SERIES 40-60






WIRING CIRCUIT DIAGRAM—SERIES 80-90

## THE SIMPLEST WAY TO TAKE GOOD CARE OF YOUR CAR

From the list of Service Operations on page 9, you will note that lubrication services are scheduled at regular intervals.

The simplest suggestion then, is that you **take your car to Buick Authorized Service every 1000 miles.** Get to know the men there, and give them an opportunity to inspect your car. These men are experienced and their recommendations may well be followed. They receive instruction in servicing Buick cars by field representatives of the Factory Service Department.



# THE BUICK WARRANTY

Buick was among the first motor car manufacturers to recognize the builder's obligation to stand behind his product and began, many years ago, to build up a service organization. Today there are over 3000 Buick Service Stations in the United States which serve Buick owners.

Buick service is another very important reason for owning a 1938 Buick. A Service Organization such as Buick offers cannot be built in a few years.

Each succeeding year Buick has made definite constructive steps toward bettering the service facilities for the Buick owner. The purchaser of a new Buick today has the advantage of this development which has taken years to build.

### SERVICE SAVER PLAN

Buick makes available and encourages its dealers to use the Buick Service Saver Plan which, as its name implies, aids owners in reducing the amount of maintenance required on their cars and insures improved performance.

This plan provides for six lubrications of the car, and one front wheel lubrication together with complete inspection at each lubrication.

Purchased in advance, the owner receives his lubrication at a reduced cost. The plan provides for lubrication at regular intervals and this together with the regular inspections, results in each Buick car being kept at its maximum efficiency. Many Buick dealers offer this service to owners.

# BUICK SERVICE POLICY

The object of Buick's Owner Service Policy is to promote the servicing of Buick automobiles on a basis of fairness to the Purchaser, the Dealer and the Manufacturer. Provisions of this service policy are briefly interpreted as follows:

1. The written Warranty, covering the first 90 days of ownership, or the first 4000 miles, guarantee to every purchaser of a new Buick a basic Service Policy.
2. **Should Buick parts or workmanship prove defective at any time during the Warranty period, Buick dealers will supply the parts and perform the necessary labor free of charge.**
3. Before delivery of new cars to purchasers every Buick dealer will determine that all pre-delivery conditioning operations, as specified by the manufacturer, have been completed.
4. **During the first 2000 miles of driving the selling dealer or any other Buick dealer in the U.S.A. or Canada will perform two inspections free of charge** except for lubricating oils and anti-freeze. The first inspection at 1000 miles and the second at 2000 miles. (This policy applies nationally except when the car is sold and serviced within the same large metropolitan city.)
5. The Buick owner can change his residence or tour any part of the United States or Canada, and still receive the full benefit of the Parts and Labor Warranty from the nearest Buick dealer.
6. At the termination of the Warranty period, the owner is offered the facilities of one of the most efficient service organizations in the world, providing genuine Buick parts at uniform list prices and service labor, based on flat rate prices.



## THE VALUE OF GENUINE BUICK PARTS

Owners should protect themselves by using only genuine Buick parts. Inferior parts involve a real risk to the purchaser, for the very fact of their cheaper price is evidence of inferior quality. To replace Buick parts with such material is not only unfair to Buick but often dangerous from the customer's standpoint.

# MANUFACTURER'S WARRANTY

**(Standard of the Automobile Manufacturer's Association)**

It is expressly agreed that there are no warranties, expressed or implied, made by the Dealer or the Manufacturer on Buick motor vehicles, chassis or parts except as follows:

The Manufacturer warrants each new passenger automobile manufactured by them, to be free from defects in material and workmanship under normal use and service, their obligation under this Warranty being limited to making good at their factory any part or parts thereof, including all equipment or trade accessories (except tires) supplied by the Car Manufacturer, which shall, within ninety (90) days after making delivery of such vehicle to the original purchaser or before such vehicle has been driven 4000 miles, whichever event shall first occur, be returned to them with transportation charges prepaid, and which on their examination shall disclose to their satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on their part, and they neither assume nor authorize any other person to assume for them any liability in connection with the sales of their vehicles.

This Warranty shall not apply to any vehicle which has been repaired or altered outside of an Authorized Buick Service Station in any way, so as in the judgment of the Manufacturer, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident.

The Manufacturer reserves the right to make changes in design or add any improvements on motor vehicles and chassis at any time without incurring any obligation to install same on motor vehicles and chassis previously purchased.

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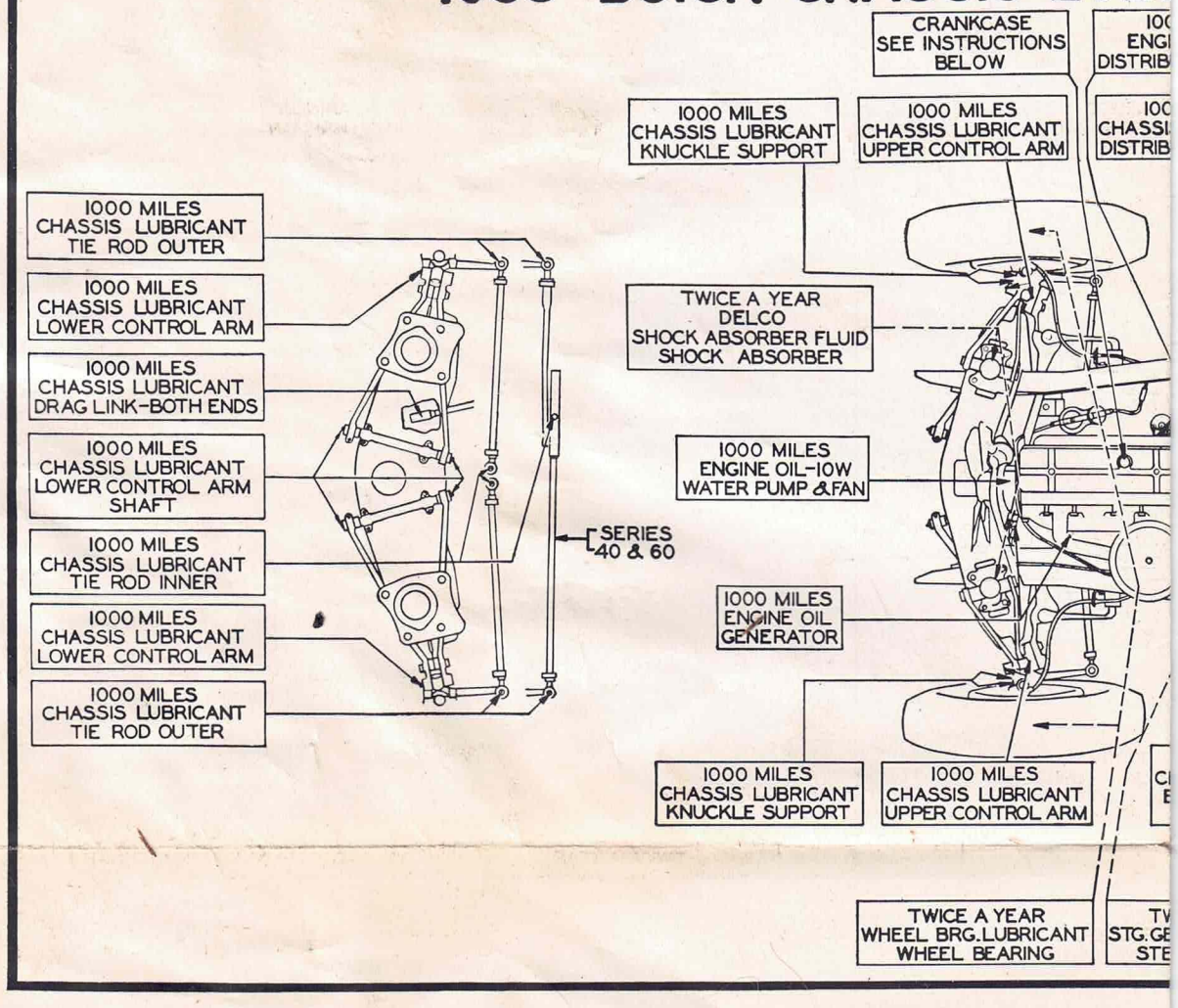
# 1938-BUICK CHASSIS LUBI




## CHASSIS

**Engine**—Oil level in the crankcase should be maintained at the "full" mark on the oil level gauge at all times. The crankcase should be completely drained and new oil of the proper viscosity added at the end of the first 1000 miles and every 2000 to 3000 miles thereafter. Adverse driving conditions may require more frequent draining and refilling.

**New Cars**—First 1000 miles, it is recommended that oil placed in the crankcase at the factory be used. For additional oil during first 1000 miles or for filling crankcases drained before 1000 miles use 10-W oil. After first 1000 miles, use grade in accordance with anticipated minimum atmospheric temperatures as follows:

| Temperature | Grade |
|---|---|
| Not lower than 32° F. | 20-W or S.A.E. 20 |
| As low as plus 10° F. | 20-W |
| As low as minus 10° F. | 10-W |
| Below minus 10° F. | 10-W plus 10% Kerosene |
| Crankcase capacity, refill: Series 40 | 6 qts. |
| Series 60-80-90 | 8 qts. |

### EVERY 1000 MILES

**Starting Motor**—A few drops of engine oil in oil cup of front bearing. Oil exposed parts with a few drops of oil.

**Generator**—A few drops of engine oil at both ends of generator.

**Distributor**—Remove distributor rotor and place a few drops of engine oil on felt wicking in top of cam. Apply small amount of petroleum jelly on distributor cam surface.

**Fan**—Fill reservoir with 10-W engine oil.

**Throttle Control Linkage and Shaft**—A few drops of engine oil.

**Chassis**—Only a good grade of water-resistant chassis lubricant should be used at points indicated in chassis diagram.

**Note:** The chassis should be lubricated every 1000 miles if car is operated on paved highways. For the car operated largely on dirt or gravel roads, more frequent lubrication is necessary.

### EVERY 2000 MILES

**Brake Master Cylinder**—Refill when more than 1 inch below top of cylinder.

**Propeller Shaft (Series 80-90)**—Remove plug and fill with 10-W engine oil.

**Air Cleaner**—Regular air cleaner element should be removed and washed in gasoline or kerosene. After drying, it should be re-oiled by dipping in S.A.E. 50 oil, allowing excess to drain off, then replace in cleaner.

**Heavy Duty Cleaner** should be cleaned every 10,000 miles or more often if conditions require.

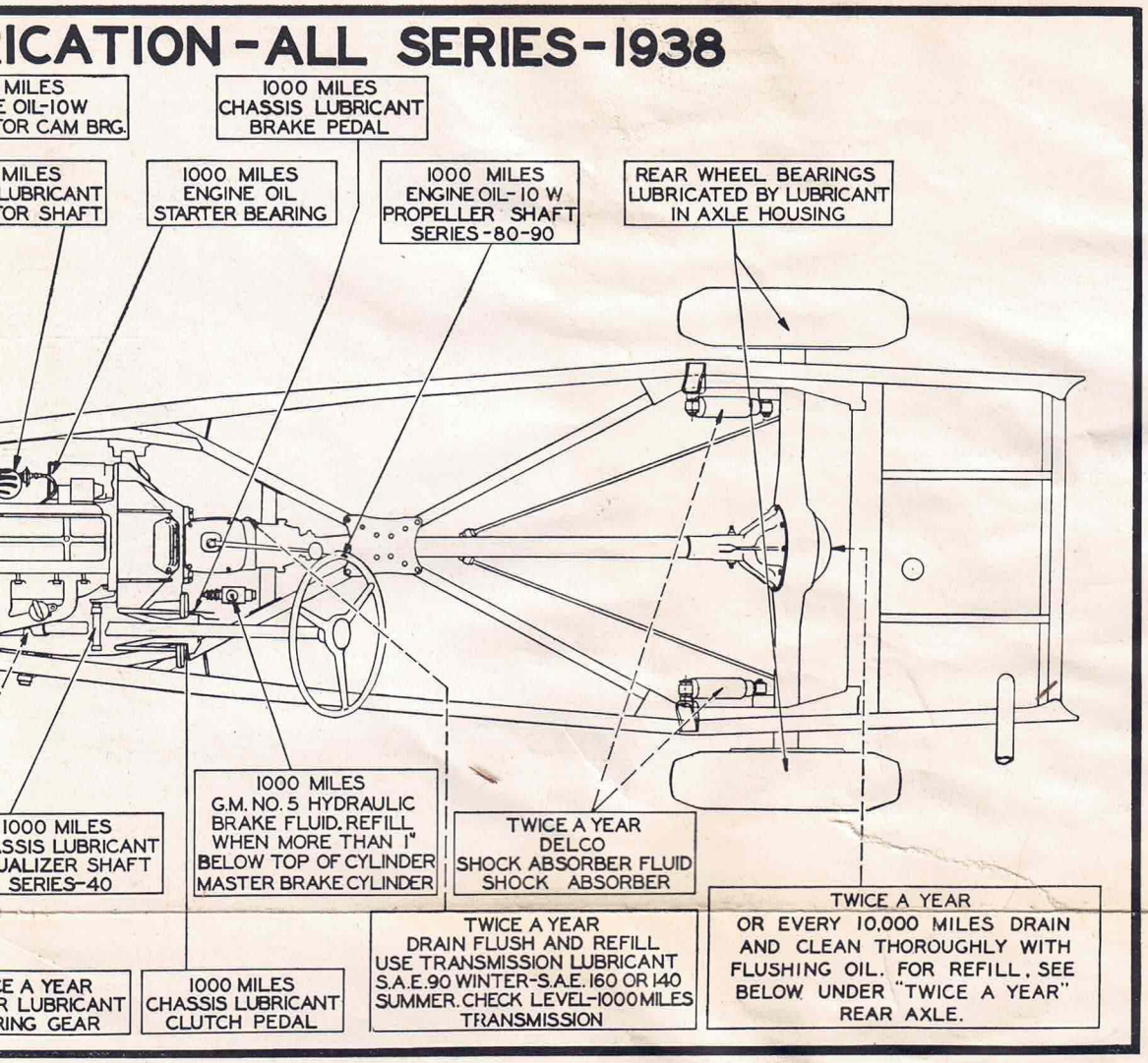
**Transmission (Synchro-Mesh)**—Check oil level; level should be maintained at filler plug opening. Add transmission oil S.A.E. 160 or 140 for summer and S.A.E. 90 for winter. See instructions under "Twice a Year."

**Rear Axle**—Check oil level—level should be maintained at filler plug opening. Add S.A.E. 90 Hypoid Lubricant. See instructions under "Twice a Year."

### EVERY 10,000 MILES

**Transmission (Self-Shifting)**—Use same oil as recommended for engine with exception that S.A.E. 30 should be used in summer for continued temperatures above 40° F.

Oil should be completely changed at the 2000 Mile Inspection period and each 10,000 miles thereafter, removing pan for thorough cleaning. Use new cork gasket without shellac or other com-




pounds when replacing pan. (Seasonal changes require only the removal of drain plug.)

Capacity.....Refill, 3 qts.; dry, 3½ qts.

### TWICE A YEAR

**Transmission (Synchro-Mesh)**—Drain completely, flush and refill with transmission oil, S.A.E. 160 or 140 for summer and S.A.E. 90 for winter.

Capacity: Series 40.....1¾ pts. or lbs.
Series 60-80-90.....2½ pts. or lbs.

**Rear Axle**—Twice a year drain completely and clean thoroughly with flushing oil. For high mileage cars, drain, clean and flush at least every 10,000 miles. Refill with S.A.E. 90 Hypoid lubricant for temperatures not lower than 10° F. below zero. For temperatures lower than 10° F. below zero use S.A.E. 80 Hypoid lubricant. Check level every 1000 miles. Oil level must not be lower than ½" below filler plug.

Capacity: Series 40-60.....3 pts. or lbs.
Series 80-90.....4 pts. or lbs.

**Steering Gear**—The steering gear is filled at the factory with a special all-season gear lubricant. This is a light, non-flowing lubricant having a temperature range from extreme summer conditions to below zero without affecting the efficiency of the steering gear. Seasonal change of this lubricant is unnecessary and the housing should not be drained. Add steering gear lubricant to level of filler plug. If other lubricants are used, it may be necessary to dilute in extremely cold weather. **Do not use pressure fitting in filler plug hole when filling gear as this will force oil up the steering column.**

Capacity: Series 40-60..... ¾ pt. or lb.
Series 80-90.....1¼ pt. or lb.

**Front Wheel Bearings**—Remove wheel, wheel hub and drum as an assembly. Apply one tablespoon of wheel bearing lubricant to each ball bearing. At this time **felt oil seals** should be examined for wear or leaking and replaced if necessary.

**Shock Absorbers**—Inspect and fill shock absorbers; these **must be** full. Use only Delco shock absorber fluid supplied by any United Motors Service Station. For filling instructions, consult Authorized Buick Dealer.

### BODY EVERY 1000 MILES

**Hood Hinges and Catch Mechanism**—Light machine oil.

**Window Regulator**—Lower window to fully opened position. Hold a piece of wire with one end touching the shaft at the gear end (inside of door). Apply a few drops of light machine oil to the wire and allow it to run down to the shaft.

**Window Regulator Arm**—Raise the window glass to the closed position. Using a squirt can, apply light machine oil along the upper edge of the sash channel on the inside for its entire length. This oil will flow down on the channel and lubricate channel, bracket and the regulator arm knob.

**Windshield Wiper Shaft**—Use light machine oil.

**Door Hinge Pins**—Use light machine oil.

**Door Lock Bolts**—Use GM Door-Ease lubricant on curved side. Use light machine oil on flat side.

**Lock Cylinders**—Lubricate with powdered graphite.

**Door Check**—Use soft soap on rod. Use light machine oil on hinge pin.

**Door Dovetail Bumpers and Striker Plate**—Apply GM Door-Ease lubricant to the metal shoes.

**Front Seat Adjuster**—Use graphite lubricant on gears. Use cup grease sparingly on seat supports.

AUTHORIZED
VALVE
Buick
IN HEAD
SERVICE

ONLY A BUICK DEALER CAN GIVE GENUINE BUICK SERVICE